Croplife

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News Briefs . . .

(Complete Stories Inside)

U.S. CONSUMPTION of primary-nutrient fertilizers was 11.7% higher in the fiscal year ending June 30, 1959, than the previous fiscal year, reports the Agricultural Research Service, U.S. Department of Agriculture. **Story inside.**

●

PROGRAM PLANS for the 10th annual fertilizer industry round table are nearing completion. The round table is scheduled to be conducted in Washington on Nov. 2-4. A new subject will be introduced at the Nov. 3 session, a spokesman said. **Story inside.**

●

PERSISTENT TECHNICAL problems face the fertilizer manufacturer today. The most serious problems, according to the International Minerals & Chemical Corp. technical service staff, are listed in this Croplife. **Story inside.**

●

PYRETHRUM is discussed by Dr. Herman Wachs, research scientist for Fairfield Chemicals, Food Machinery & Chemical Corp., who recently toured Africa's pyrethrum growing areas. **Story inside.**

●

SWIFT & CO.'S agricultural chemicals plant in Hayward, Cal., has become the victim of a population explosion and has been forced to move to a new location. **Story inside.**

●

SULFUR PRODUCTION in the U.S. in 1959 totaled 6.2 million tons, which was up slightly from 1958, but still well below the 7 million tons of 1957 and the 7.8 million of 1956. **Story inside.**

●

CHARLES T. HARDING, veteran fertilizer industry personality, was honored recently by his company, Virginia-Carolina Chemical Corp., when his name was given to a modern superphosphate plant. **Story inside.**

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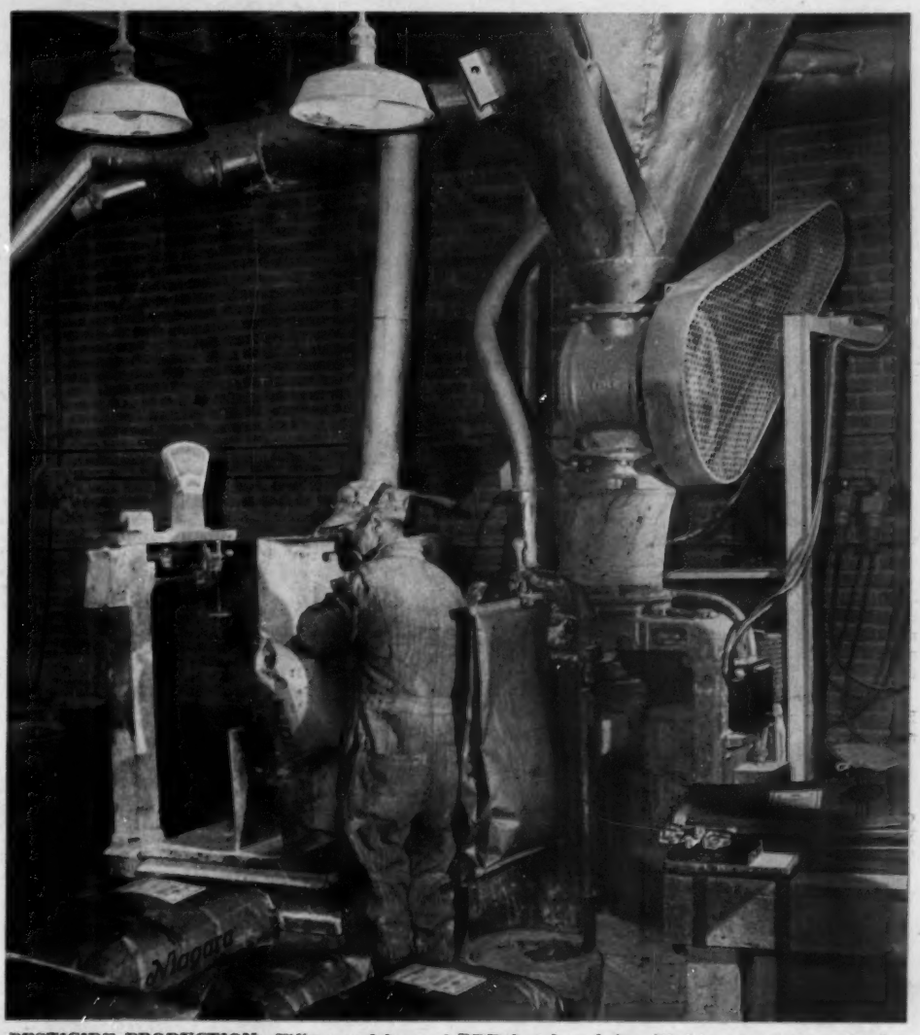

PESTICIDE PRODUCTION—Fifty-pound bags of DDT dust base being filled by one of six packaging machines at pesticide plant of Niagara Chemical Division, Middleport, N.Y. Workers in plant are required to wear masks as part of firm's safety code. See complete story on Niagara Middleport operation, pages 4 and 5, this issue.

Possibility Seen for Controlling Release Of Toxicants by Encapsulation of Products

EDITOR'S NOTE: *Croplife brings the accompanying article to the attention of manufacturers of both pesticides and fertilizers with the thought that the encapsulation process described here might have application in the production of these agricultural chemical products. According to staff scientists at the National Cash Register Co., Dayton, Ohio, who prepared this paper for Croplife, the easing of problems associated with handling toxic materials and gaining sustained or controlled release properties of pesticides or fertilizers, appears to hold some promise to manufacturers throughout the country.*

TO BE ABLE to enclose or confine a substance in extremely small capsules, and to release it later on if desired, has been one of man's hopes for years in many fields. The Micro-Encapsulation process developed by the National Cash Register Co. appears to meet this need with such success and versatility as to form, size and make-up of the capsules, as to mark them as a new "tool" of wide utility. Use of this process has already indicated the possibility of better products in several fields. Other applications are also under consideration, and many more are sure to come as knowledge of the capabilities of these capsules becomes more widespread.

It is the purpose of this article to describe the production and some of the major properties and capabilities of NCR capsules, and to outline a few illustrative uses, so that those who deal with situations benefiting from the enclosing of a substance, with or without subsequent release, may know more of what this process can do.

NCR micro-capsules should not be confused with the large 2-part kind of capsule found in drug stores. NCR capsules are generally spherical in shape and of such small size as to resemble

Turn to **ENCAPSULATION** page 19

Coming Round Table Features Panel on Standardization

BALTIMORE, MD.—Program plans are nearing completion for the 10th annual fertilizer industry round table scheduled to be conducted at the Mayflower Hotel, Washington, D.C., Nov. 2-4.

Although not all invited speakers have confirmed their acceptance to appear on the program, the present agenda calls for discussions both from the platform and from the floor, on phosphate rock, phosphoric acid, storage and handling, triple superphosphate problems, and economics of fertilizer manufacturing.

The program for Thursday, Nov. 3, will introduce a new subject for the round table, that of standardization of raw materials. This topic will be discussed from the standpoint of both users of fertilizer raw materials and producers of same. A panel of six or seven users will discuss their side of standardization in relation to problems of production and maintaining guaranteed analyses; while a similar number of producers will point out problems in connection with their side of the question. Question and answer sessions will enable production people in the audience to participate in portions of the panel discussion.

The problem of "in plant" shrinkage is to be discussed specifically as one portion of the standardization panel.

"Communication Problems in Instrumentation" is the topic for Thursday afternoon, Nov. 3, with a panel discussion again featuring the session. In this case, the panel is expected to consist of representatives of companies which manufacture various types of gauges and instruments for use in the fertilizer industry.

A business meeting will be held Friday morning, Nov. 4, followed by a session on preneutralization which will be discussed by three industry technologists.

In the absence of Dr. Vincent Sauchelli, founder and chairman of the Round Table, J. E. Reynolds, Davison Chemical Division, W. R. Grace & Co., Baltimore, Md., will act as chairman pro tem.

Phosphoric Acid Plant Planned by Olin Mathieson

NEW YORK—A $1,500,000 plant to manufacture phosphoric acid will be built by Olin Mathieson Chemical Corp. at Joliet, Ill., it was announced on Sept. 23.

Edward Block, senior vice president and general manager of the corporation's chemicals division, said capacity of the new plant will be approximately 50,000 tons a year. The phosphoric acid will be a 75% concentrate.

Construction contracts have already been let, Mr. Block said, and preliminary work is under way. The plant, at the Blockson operation of Olin Mathieson, should be completed by the end of April, 1961. Blockson

(Turn to PHOSPHORIC, Page 6)

Canada Agriculture Minister States Desire to Avoid 'Cranberry Episode' There

By JAMES L. ENGFER
Croplife Staff

LAKE OF BAYS, MUSKOKA, ONT.—Douglas S. Harkness, Canadian minister of agriculture, was the keynote speaker at the 8th Annual Meeting & Conference of the Canadian Agricultural Chemicals Assn., Sept. 11-14, held at the Britannia Hotel in this beautiful northern Ontario resort area.

Mr. Harkness told the 175 delegates and guests, representing pesticide manufacturers, government agencies and science from Canada, the U.S. and Europe, that Canada is anxious to avoid a "cranberry situation" and because of "extremely good relations and liaison" between Department of Agriculture, Food & Drug officials and the agricultural chemicals industry, "we have been able to avoid creating apprehension in our own consuming public, prevent losses for growers, and maintain the reputation for quality in the farm products we export."

He said, however, that the residue problem would demand continuing attention and the best possible type of collaboration from the agricultural chemicals industry.

Discussing the economic problems of the Canadian farmer, Mr. Harkness said that many factors have led to insistent demands for government assistance to bring the farmer's level of living into line with that of workers in industry and business.

"In a country like Canada," he said, "where costs are high, that can only be accomplished by securing for the farmer higher prices for his products than those in any other country except the U.S., where costs are high also. This can only be done by such artificial means as price supports, tariffs, import controls and the like, and the government of Canada is making use of all these devices to the extent that is deemed wise. That is, to the extent that we do not risk retaliation for actions that we might take in the tariff field, or charges of dumping subsidized products on the markets of other countries when we find it necessary to export farm commodities that have received price support."

He said that the availability and proper use of agricultural chemicals are recognized in all advanced countries as essential to the welfare of the farming industry.

At the annual meeting, held Sept. 12, J. K. Brown, general manager, Green Cross Division, Sherwin Williams Co of Canada Ltd., Montreal, was elected president.

Other officers and directors elected for the coming year include: J. G. Hastings, Chipman Chemicals Ltd., Hamilton, first vice president; D. K. Jackson, Monsanto Canada Ltd., Montreal, second vice president; C. R. Burrows, Allied Chemical Canada,

(Turn to CACA MEETING, Page 28)

U.S. Fertilizer Use Increases 11.7% in Past Year; Minor Nutrients Register 30.2% Rise

WASHINGTON — Fertilizer consumption in the U.S. for the year ended June 30, 1959, amounted to 25,312,672 tons, reported the Agricultural Research Service, U.S. Department of Agriculture.

Consumption of primary-nutrient fertilizers was 2,513,433 tons or 11.7% more than 1957-58, and the quantity of the secondary and trace nutrient materials was 283,476 tons or 30.2% more than the preceding year.

The report, which was prepared by Walter Scholl, Marion M. Davis and Caroline A. Wilker, Fertilizer Investigations Research Branch, Soil & Water Research Division, noted that the total was comprised of 24,098,468 tons of products containing one or more of the primary nutrients and 1,223,204 tons of secondary and trace nutrient materials.

Change in Fertilizer Consumption in Regions and U.S., Year Ended June 30, 1959

Region	—Increase or decrease (—) from year ended June 30, 1958— Mixtures tons	Materials* tons	Total* tons	Mixtures %	Materials* %	Total* %
New England	6,741	—2,287	4,454	1.8	—3.2	1.0
Middle Atlantic	87,718	12,963	100,681	5.1	6.5	5.3
South Atlantic	544,277	154,894	699,171	11.8	16.3	12.6
East North Central	306,601	101,635	408,236	9.2	7.5	8.7
West North Central	349,863	281,351	631,214	29.1	25.4	27.3
East South Central	283,064	67,866	350,930	15.8	8.3	13.4
West South Central	59,889	49,775	109,664	9.5	7.1	8.2
Mountain	4,374	22,277	26,651	6.3	5.1	5.3
Pacific	36,536	107,572	144,098	9.7	7.4	7.8
Total	1,679,053	796,046	2,475,099	11.9	11.2	11.7
Hawaii	—5,710	20,895	15,185	—9.5	35.0	12.7
Puerto Rico	42,661	—19,512	23,149	23.5	—36.9	9.9
U. S.	1,716,004	797,429	2,513,433	12.0	11.0	11.7

*Excludes quantities of secondary and trace nutrient materials for direct application.

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Sulphuric Plant Producing At Wyoming Location

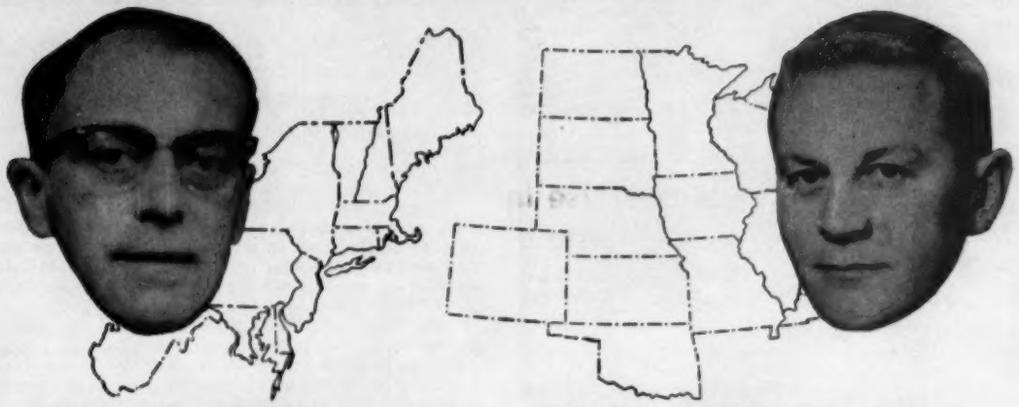
RIVERTON, WYO.—Susquehanna-Western, Inc., Denver subsidiary of the Susquehanna Corp. of Chicago, recently started production in its second sulphuric acid manufacturing plant here.

Allen D. Grey, S-W president, said the plant doubles the firm's sulphuric acid production capacity. The new unit increases capacity to 75,000 tons of acid each year.

Mr. Grey said Susquehanna's total investment in acid producing plants now surpasses $1 350,000. It is the only producer in Wyoming. The product is used principally in the manufacture of fertilizer, and also in oil refineries and the sugar industry.

The second S-W plant here was constructed in four months and is fully automated.

"WE HAVE BUT TWO PRODUCTS . . . POTASH AND SERVICE"



ROBERT B. LENHART
joined PCA in 1956 and is Sales Representative for the Northeast. A graduate of N.Y. State Agricultural School, he is president of the Empire Soil Fertility Ass'n, and is a board member of the New Jersey Plant Food Educational Society.

FRANK H. KENNEDY
is PCA's Sales Manager for the Midwest, with offices in Peoria. He is a graduate of the Catholic University of America, was a wartime naval aviator, and has broad experience in the plant food industry, having joined PCA in 1950.

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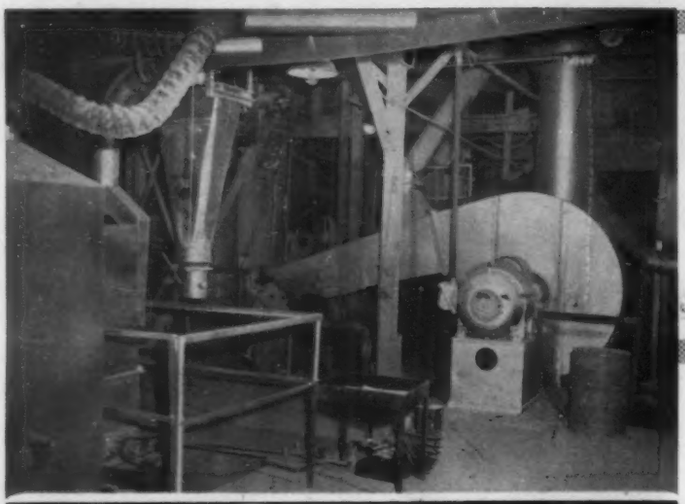
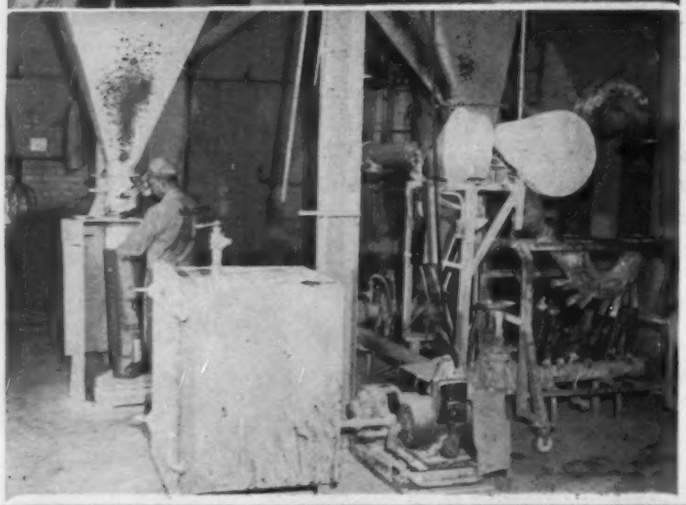




Niagara Division Stresses Safe,

VERSATILITY and improved operating efficiency have helped the 55-year-old headquarters of the Niagara Chemical Division, Food Machinery & Chemical Corp., to meet production challenges coming from dramatic changes in industry.

Niagara, one of the country's leading pesticide producers, has several times made significant modifications in its Middleport, N.Y., operations in the face of new industry developments. These adjustments reflect the changing nature of pesticide materials.

Stuart H. Bear
Niagara Div. Manager

Niagara was established at Middleport in 1904, originally as a manufacturer of bordeaux-mixture fungicides. Soon after, the plant entered into production of inorganic materials such as arsenates, copper compounds, sulfur and nicotine for use as pesticides. When organic materials began replacing them after World War II, the factory started to produce carbamate fungicides and DDT and BHC formulations.

Now Niagara has turned its attention to a promising group of newer organic materials. This is one result of a company-wide reorganization began five years ago that has brought greater emphasis upon research, a new line of products, and revamping of production and marketing units.

The new materials, all Niagara-controlled specialties, include pesticides and herbicides* for control of pests and diseases on fruits, vegetables and other crops. The ability of the Middleport facilities to adjust smoothly to these new products is laid to its concern with production efficiency and quality control.

Economies have been effected through greater utilization of large volume equipment and better control of active material variables during production runs. First-rate quality control of products has come from use of special filtering and screening equipment found in only a few pesticide plants and from broader responsibilities for the production control laboratory. And improved inventory control has been made possible by the decentralization of marketing units, thus permitting more accurate forecasts of product demands.

At the same time, Middleport has remained the production headquarters of the division, channeling its know-how to other Niagara plants as they have opened (now 17 in all) and supplying them with base materials.

Several Operating Departments

To handle its various production assignments, which still involve a good many of the older pesticide materials, the plant is divided into several operating departments. They cover the following areas: Arsenicals; arsenic acid; liquid mixing and packing; dust mixing and packing; grinding; Kolofog; carbamates; soluble sulfur; maintenance; power; material handling, and Fairfield Department. The last named, which manufactures household and specialty insecticide concentrates, is located in a separate building to avoid product contamination.

Five basic types of grinding equipment are available to meet product specifications regarding particle size. Each has a special zed function.

The three mikropulverizers are best suited for the preparation of certain inorganic and organic pesticide materials. One of these is used in the arsenicals operation only and has a large capacity. The other two are used in small

*Trade names include Thiodan, Tedion, ethion, Phostex and Niacide, all registered trademarks.

INSIDE NIAGARA PLANT—Photos this page, top to bottom: Raymond 4-roll high side roller mill, part of continuous grinding system for sulfurs and some organic mixtures. Next photo shows small bags of Malathion 25% wettable powder coming off sealing machine and being packed in baler by worker wearing respirator as precautionary measure. Third photo shows view of Kidwell mill used for fine grinding of suspensible powders and other organic materials at Middleport plant. At left is rear view of Middleport plant, revealing some of its extensive facilities.

Pesticide Unit Efficient Plant

batch size systems on short runs. Larger runs can be assigned to the Raymond Imp Mill which ordinarily operates as a part of a continuous grinding system for carbamates—or other larger units. If a material contains large agglomerates, it can be sent through one of the pregrinding mills before going on to the mikropulverizers.

The other types of grinding equipment on hand are the air mill which gives extreme fineness of grind, often required for products such as 75% DDT and certain fungicides, and the Four-Roll High Side Raymond Roller Mill used to grind sulfur dusts and some 50% organic materials.

Blending Mills Used

In addition, there are two kinds of blending mills, straight attrition and entoleter, which run at high speeds to break up agglomerates and m'x components properly. Other equipment includes: Drum dryers for arsenicals; reaction kettles and tanks for arsenic acid and sodium arsenite, and roasting furnaces for letharge, raw material used in lead arsenate.

Of particular importance to product quality control is the plant's filter and screening equipment. The filters remove solid impurities from liquid formulations manufactured in the mixing tanks. The screens remove from powdered materials any foreign matter that could later clog nozzles during commercial spray operations.

The plant's packaging system is quite flexible, and bagging equipment is often moved as needed. Six St. Regis machines package bulk orders in 50-lb. valve bags, and eight Stokes & Smith Packers handle small bag packaging of such materials as spray dusts, generally bought in small amounts. Small bags range in size from 1 to 17½ lb. and are, in turn, packed in cartons or balers. Liquids are shipped in 30- and 55-gal. drums and 1- and 5-gal. containers.

Supporting the production and packaging operations are 11 fork-lift trucks, 2 front-end loaders, and 2 dump trucks that are used for miscellaneous purposes on the plant grounds.

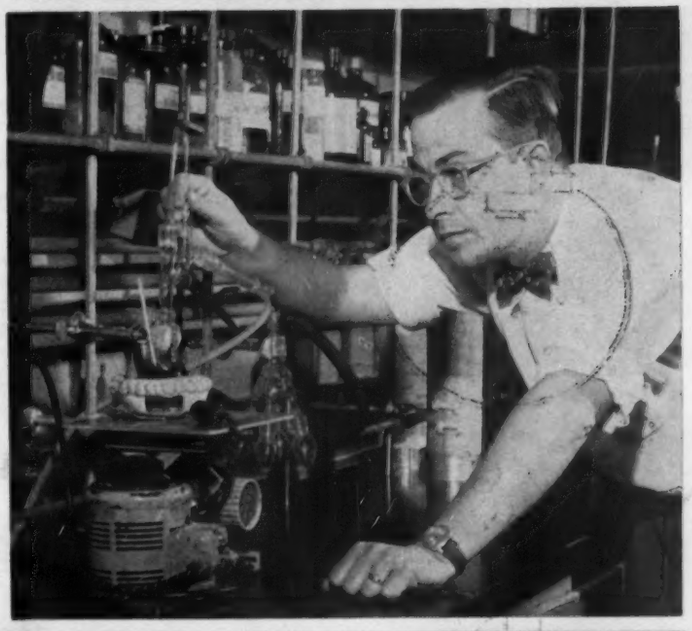
Three Merchandising Units

Plant products are sold through three decentralized merchandising units in the form of finished formulations for commercial agriculture, basic technical chemicals for industry, and finished insecticide concentrates for household spray and aerosol markets. Bulk and distant orders are shipped from Middleport via tractor trailers or railroad cars. Four trucks of 5½-ton capacity make on-the-spot deliveries to growers located within approximately 100 miles of the plant.

Several developments have helped free Middleport facilities from the demands of other staples for production of the new materials. As Jim Jones, Middleport production manager and Niagara coordinator of production, explains it: "The use of higher concentrations of active materials in formulations, while increasing product value, has decreased the tonnage of finished products we produce. The lessening demand for lead arsenicals, once major items with us, has also cut down tonnage."

"This reduced tonnage in the older products as well as the production relief we are now getting from newer Niagara plants, has given us more space for the new specialties coming along without the need for additional buildings," he says.

Because Middleport makes bases and specialty items for other Niagara plants (and sales area) its tonnage figures for finished products, about 10 to 15% of the company total, are not particularly significant. About half the



PESTICIDE FACILITIES—Above, right: Stacking 50 lb. bags of 50% wettable powder pesticides in Niagara's warehouse at Middleport. Fork lift truck is one of 11 serving the plant's needs. Middle photo: Close attention is given to test result in development of new products at Niagara's research laboratories at Middleport, headquarters of all divisional research activities. At right: Jim Jones (right), manager of Niagara's Middleport plant, discusses production problem with Greg Beierl, assistant manager.

Middleport total goes to growers and distributors in Region I—the sales areas served by this plant. Some one-third goes to other regions and branch plants and the remainder to the household insecticide field.

Of the 12 other Niagara plants in this country, four of them have sizeable production facilities. They are located in Jacksonville, Fla.; New Orleans, La ; Richmond, Cal., and Fresno, Cal. The others, which are primarily blending operations, are established in Pompano, Fla.; Tampa, Fla.; Wyoming, Ill.; Pine Bluff, Ark.; Harlingen, Texas; Yakima, Wash.; Ayer, Mass., and South Haven, Mich. Plants have also been opened in Canada and Mexico, two in each.

Heading up the Niagara organization is Stuart H. Bear, division manager, who joined the company's sales force in 1927. Middleport factory operations are guided by Jim Jones, production manager, a chemist with 15 years of Niagara experience, and Greg Beieri, assistant manager. Foremen of general production, maintenance, and the Fairfield department are Julius Antonucci, John Cameron and Earle Draper, respectively.

Control and Research

In line with the increased emphasis upon research, the laboratories at Middleport take special pains with existing products and new formulations. The production control laboratory checks both the physical and chemical compositions of finished materials before approving their release. The research formulation laboratories, which are also the headquarters of all divisional research activities, strive for efficient and practical formulations that will work well in production and result in quality products.

The research group has full responsibility for new products, from their inception through field trials and federal registration. It is currently testing a group of anilide herbicides for post-emergent use on cotton and vegetables. Also in the testing stage are a series of soil fungicides, repellents and synergists.

The 240 employees at Middleport benefit from a commendable safety program that boasts of 1,431,946 manhours without a lost-time accident (as of Jan. 31). Backbone of the program is a safety committee composed of both union and management representatives. It meets monthly to discuss safety practices, and members make periodic plant inspections. Safety precautions include the required use of rubber gloves and respirators in many plant operations. Available for consultation on the toxicity of materials is a noted specialist in that field, Dr. Nils Klendoshoj.

The Middleport management derives considerable satisfaction not only from this safety program, which has been recognized with a number of awards, but from the plant's general production performance. It is looking forward with anticipation to the challenges ahead in the agricultural chemical field.

Sulfur Production In 1959 Slightly Over 1958 Output

WASHINGTON — United States production of sulfur in all forms in 1959, as reported by producers to the Bureau of Mines, U.S. Department of the Interior, totaled 6.2 million tons, up slightly from 1958, but still well below the 7 million tons of 1957 and the 7.8 million of 1956. The nation's 1959 supply was augmented by 632,000 tons of Frasch sulfur and 37 025 tons of recovered sulfur from stockpiles, the report says.

Of the total U.S. production, 4.5 million tons was sulfur mined by the Frasch hot-water process from salt-dome deposits along the Gulf Coast; 0.7 million tons was elemental sulfur recovered from refinery and sour natural gases; 0.4 million tons was sulfur contained in pyrites; 0.3 million tons was sulfur from smelter gas; 0.2 million tons was sulfur, or its equivalent, recovered from other sources.

Sulfur consumption also reached a new high in 1959, despite a lessening of the demand by a strike-bound steel industry, which normally uses 7%. As shown by a 12% increase in the apparent consumption, the loss in the steel industry was more than offset by higher demand by other large industries for fertilizers, chemicals, and other consumers. Considerable improvement also was noted in the world markets for sulfur, consumption reaching a new high of 16 million tons.

Imports of Frasch sulfur set a new record, but failed to maintain the sharply rising trend begun in 1955. Foreign producers were aided in their sales to the American consumer in certain areas of the country by the low freight rates on foreign vessels whose use by U.S. suppliers for movement to domestic ports is forbidden by law.

Sulfur exports from the United States increased during 1959, despite growing competition from numerous new foreign producers. The major importing countries, in order of volume, were: Canada, the United Kingdom, Brazil, India, and Australia.

Producers' stocks of Frasch sulfur on hand Dec. 31, 1959, totaled 3,809,708 long tons, 14% below the 4,441,757 tons on hand the previous year.

PHOSPHORIC

(Continued from Page 2)

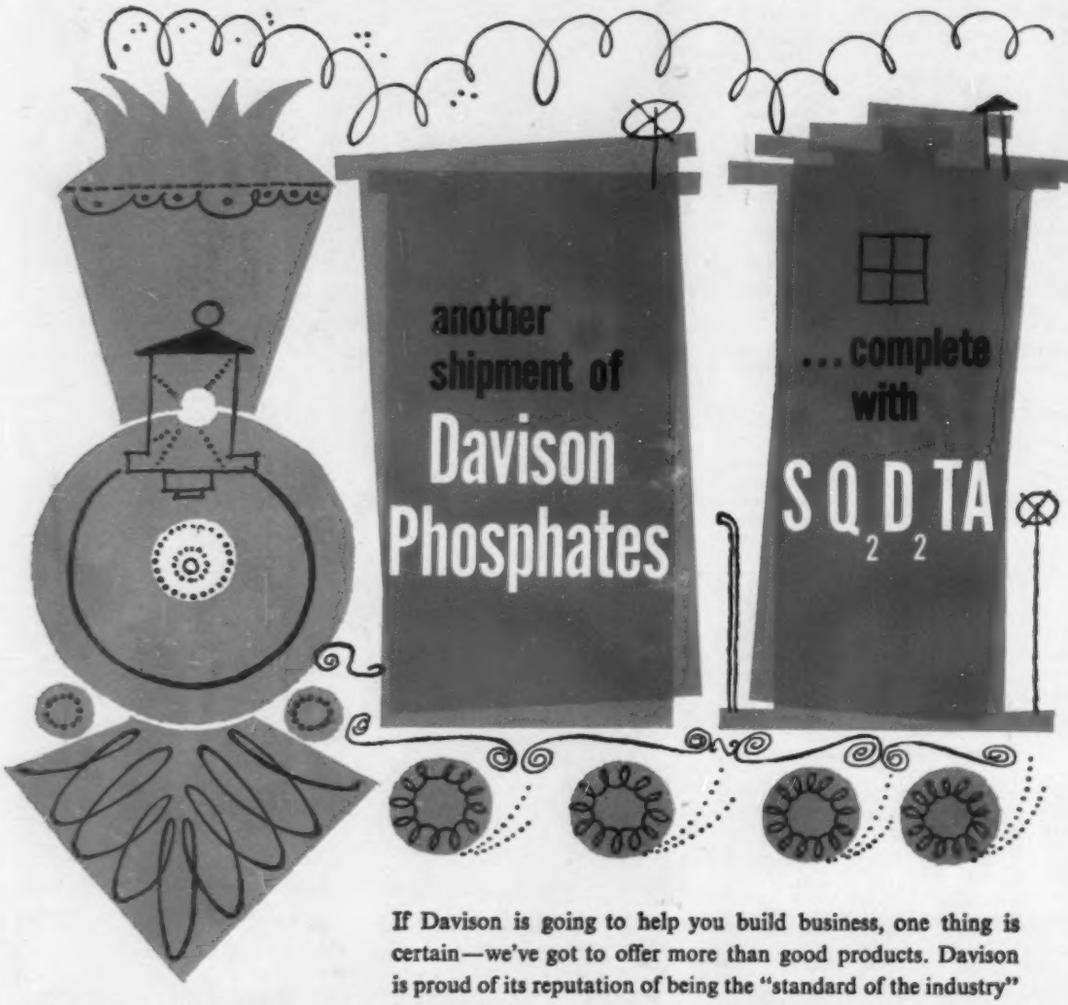
was a pioneer in the wet process for the production of phosphoric acid for the manufacture of sodium phosphates.

Production probably will go to fertilizer manufacturers in the Midwest, especially in the states of Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa and Ohio.

Mr. Block said there is a growing demand for high analysis fertilizers among farmers seeking greater yields with less work and investment. With high analysis, the farmer distributes less material over the soil, but adds as much or more plant food than with ordinary fertilizers.

Olin Mathieson owns and operates a high analysis fertilizer plant at Pasadena, Texas—the largest of its type in the world. However, this plant will not be a customer for the acid production of the Joliet plant, Mr. Block said.

The phosphoric acid plant is not part of the $30,000,000 chemicals expansion program announced by the corporation last year. That program included improved chlorine production facilities at Niagara Falls, N.Y., new facilities for production of petrochemicals at Brandenburg, Ky., and sulfamic acid at Joliet.



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Wind and Water Threaten Fertilizer, Pesticide Plants in Hurricane Donna

PESTICIDE and fertilizer plants in the path of Hurricane Donna which tore up the Atlantic Coast from Florida to New England recently, fared reasonably well in the big blow, according to reports received by Croplife from a number of industry people in the affected area. Plants were shut down for varied lengths of time because of electric power failure and flooding conditions, but no reports were heard of operations being badly crippled by the winds.

Plants in the Tampa, Florida area were damaged to a considerable extent, according to a report from Fred J. Woods, president of The Gulf Fertilizer Co., Tampa. Windows and window frames were blown in, corrugated metal stripped off, and some roof damage from flying debris was mentioned, but the greatest dollar loss, Mr. Woods said, was from water damage.

"Our own plant is a pit plant, with the floor level being considerably below ground level," Mr. Woods explained. "The pit is protected by a wellpoint system surrounding the plant, operated with electric pumps. With the loss of power from Saturday until Monday, we had a considerable amount of water come into the plant through joints and some cracks in the concrete.

"Needless to say, this made very much of a mess. Many of the materials are water soluble, and those that were not became mud in the presence of free water.

"In spite of this situation, we were able to pump out pretty well by Monday afternoon, and while the extensive crop damage precluded much interest in fertilizer, we have been in a position to fill our orders since Tuesday morning. (Sept. 13) We were out of production only one day."

"I believe this story is generally the situation in all plants in the immediate Tampa area. As a matter of fact, the five Tampa plants have been busily engaged since Tuesday morning bagging sand for use in protection of homes located near the river, for the flood was reaching the conditions which existed last July and last March when serious damage was done. I expect in the neighborhood of thirty cars of sand have been bagged for this emergency use."

A chronological description of the hurricane's activity was reported by R. R. Hicks, Coronet Phosphate Co., Plant City, Fla. He says that the center of the hurricane reached his area around noon on Sept. 10 with winds up to 110 miles per hour. Mining operations were suspended at 7 that morning and plant operations stopped at 3 p.m. the same day.

Four days later, mining operations were resumed and plant operations started up again on Sept. 12, he said.

There was no appreciable damage to the plants excepting downed power lines. High water in the mining area was the main reason for delay in resuming these operations. Numerous electric motors in the operation would have become wet and shorted had they not been covered before the high wind gusts arrived, Mr. Hicks said.

Illustrating the erratic nature of Hurricane Donna is a report from H. H. Boltin, of the Haley Chemical Co., Dade City, Fla. He says that his plant received no damage at all, for which he is very thankful. "The storm passed east of us about thirty miles. The only damage in this area was a 10% loss of fruit and flooded conditions in low places."

A much more calm story comes from A. B. Irving, of Chester Chemical Corp., St. Petersburg, Fla. He says that the hurricane arrived on schedule Saturday afternoon, Sept. 10, but did little damage in that area. He said there was not even any loss of electricity there.

Moving up the coast, the hurricane continued to blast at fertilizer and pesticide plants lying in its path. However, according to reports received from principals in this area, little actual damage occurred.

Reporting for the Robertson Chemical Corp., Norfolk, Va., J. C. Reeves, production manager, says that two of the company's plants located at Wilmington, N.C. and Norfolk, Va., were hit by the hurricane. However, other than a few patches of roofing and some boards torn loose, little damage was suffered. "In dollars and cents, it will amount to about $2,500 for both plants," he estimated.

However, loss of electric power was the main inconvenience suffered by the operations. "We were without power for seven hours in Norfolk and for 2½ days at Wilmington." Mr. Reeves added, however, that since this is a slack time, production-wise, little business was lost from this delay.

Management of the F. S. Royster Guano Co., Norfolk, Va., reported that its Mulberry, Fla. plant received little damage to the physical buildings, but excessive rainfall caused a water problem for some time.

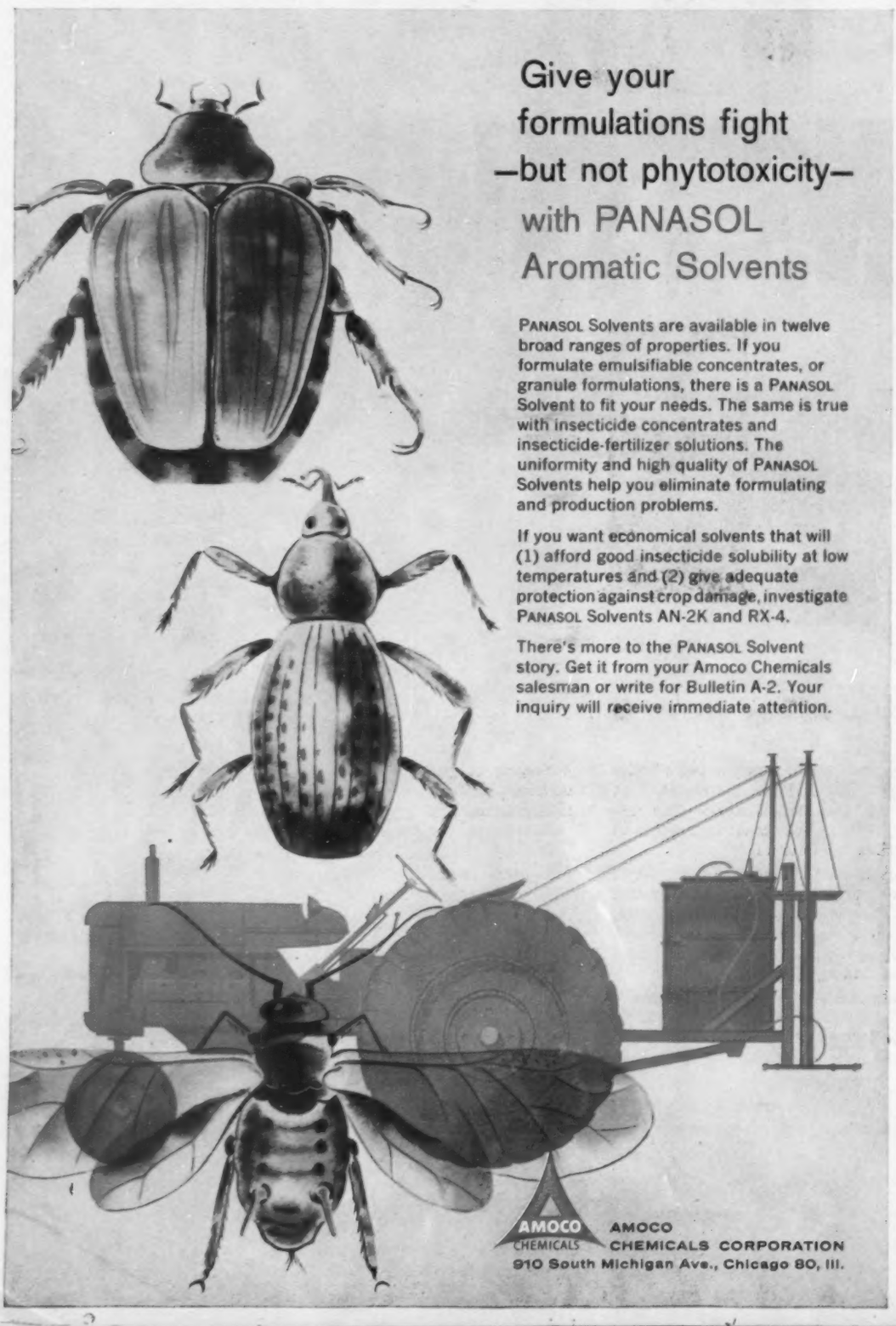
Royster's Wilmington, N.C. plant suffered damage to the plant's roof from the wind, as was true also of its Money Point, Va. operations.

Royster plants at Charleston, S.C. and Norfolk, Va. received only minor damage, it is reported.

A possible ten-day shutdown of the Norfolk, Va. plant of Virginia-Carolina Chemical Corp. was predicted by Charles D. Griffin of the plant staff. He said the plant would probably be out of operation until Monday, Sept. 19, largely due to power lines being down and electric motors and other equipment in the plant having been thoroughly soaked.

"Some physical damage to our buildings occurred, but nothing of serious nature. Fortunately, the hurricane hit us on low tide; high tide would have meant water in our plant

(Turn to HURRICANE, page 27)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IN PRODUCTS · SERVICES · LITERATURE

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No. 9267—Stabilizing Agent for Liquid Fertilizers

The stabilization of liquid fertilizers is discussed in a new technical data sheet published by Minerals & Chemicals Corp. of America. The material described is a colloidal grade of Attapulgite as an agent for the suspension of plant nutrients in water. The 8-page bulletin completely describes how the use of this material helps to overcome analysis and uniformity problems in liquid fertilizers. Types of fertilizers with which it has been successfully employed are presented in the bulletin. The 8-page data sheet also discusses how the material is used and gives detailed specifications for the limited amount of process equipment required. Also given are six typical fertilizer formulations in which the material has been used successfully. Properties of the new material are presented in chart form. For full information, and a copy of the bulletin, check No. 9267 on the coupon and mail to this publication.

No. 9265—Pre-Mix Weighing System

A new "Select-O-Weigh" system for automatic pre-mix blending to eliminate human error and to provide fast and accurate low-cost proportioning, is described in a Product Data Sheet offered by Richardson Scale Co. The new system is designed for punched card controlled batch proportioning operations in which it is necessary to introduce small quantities of special pre-mixed ingredients into the main batch. The available data sheet describes controls of the system as well as the scale, feeders and other equipment. Photographs of several of the components are included. For full information on the system, check No. 9265 on the coupon and mail to this publication.

No. 9261—Adjuvant Information

Colloidal Products Corp. has issued a 4-page bulletin describing the use

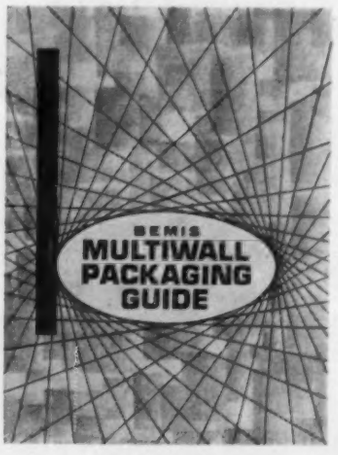
of its adjuvants for the formulation of pesticides and for use in liquid fertilizer products. The bulletin describes the company's products as comprising a variety of adjuvants specially formulated for specific uses. The bulletin indicates that each adjuvant imparts properties resulting in the spray chemical's performing its required functions more effectively and economically. Described and illustrated are a number of the adjuvants made by Colloidal and information is given on their use. Copies of the bulletin may be obtained by checking No. 9261 on the coupon and mailing to this publication.

No. 9262—All-Steel Building

A new multi-purpose pre-fabricated steel building has been developed by Martin Steel Corp. for industrial use, particularly in the chemical field. The new structure, said to be fireproof and rust-resistant, is described as a safety engineered structure that combines "practicality with flexibility of design to simplify planning for specific requirements." The makers say the facility is designed for fast, easy assembly and is constructed for serviceability with a minimum of maintenance. It says a wide variety of sizes is available to fit individual needs and any desired combination of sliding or walk-in doors, skylights, windows and ventilators may be had to simplify planning. The design also allows for future expansion. Lengths start at 32 feet, coming in multiples of 16 feet, to give any desired length. There are three basic heights: 10, 12 and 14 feet. For further information concerning such structures, check No. 9262 on the coupon and mail to this publication.

No. 9258—Packaging Guide

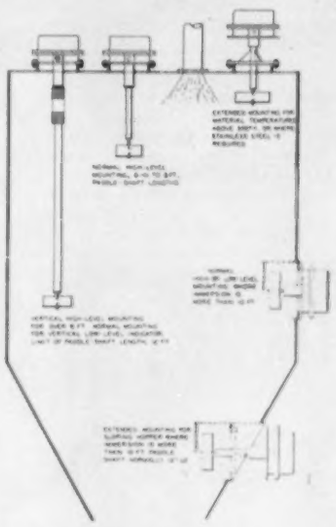
Bemis Bro. Bag Co. announces the availability of a 16-page "Multiwall Packaging Guide" containing information on basic types of multiwall bags. Also covered are the principal types of multiwall bag closures, prop-



er storage and handling of multiwall bags, railway car and truck trailer bag loading systems and multiwall packaging equipment. For copies, check No. 9258 on the coupon and mail.

No. 9266—Material Level Indicators

Material level indicators that may be used to indicate the level of pulverized, crushed or granular materials in bins and silos are offered by the Fuller Co. The firm says that these indicators are used also to control such equipment as feeders, valves, elevators and conveyors. They exercise this control by starting or stopping the motor driving the equipment when a pre-determined material level is reached. The makers state that a sensing paddle located at the desired material level is rotated by a

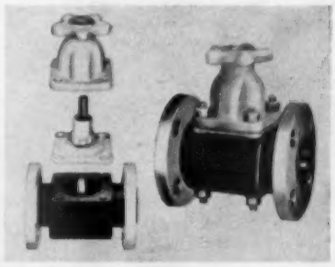


Typical applications of the Fuller Material Level Indicator

shaded-pole inducted motor located at the casing outside the bin or silo. When the material restrains the paddle from turning, the motor and its mountings revolve around the drive shaft, actuating two switches mounted in the base of the indicator. When the material falls away from the paddle, the motor frame assumes its initial position, releasing the switches and causing the motor to turn the paddle again. For full information concerning the bin level indicators, please check No. 9266 on the coupon and mail to this publication.

No. 9264—Diaphragm Valves

Falls Industries, Inc., describes in a new bulletin the characteristics of its series of small diameter impervi-



ous graphite diaphragm valves. These are claimed by the manufacturers to be unaffected by almost all corrosives and immune to effects of thermal-shock, non-contaminating and can accommodate operating pressures to 50 psi at temperatures up to 340 degrees F., and can handle gas, liquids or slurries. Copies of the 5-page bulletin are available by checking No. 9264 on the coupon and mailing to this publication.

No. 9263—Continuous Processing Bulletin

Dorr-Oliver, Inc., has revised its 16-page brochure entitled "Continuous Processing," illustrating and listing the distinguishing characteristics and applications of 55 types of continuous

Send me information on the items marked:

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- ☐ No. 9257—Truck Scale
- ☐ No. 9258—Packaging Guide
- ☐ No. 9259—Patented Feeder
- ☐ No. 9260—National Parts Service
- ☐ No. 9261—Adjuvant Information
- ☐ No. 9262—All-Steel Building
- ☐ No. 9263—Continuous Processing Bulletin
- ☐ No. 9264—Diaphragm Valves
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processing equipment manufactured by the firm. Among the unit operations listed are agitation, classification, straining, filtration, pumping, water pre-treatment, complete water treatment, drying and dry classification and Ion-exchange. Pilot plant equipment is also described with special emphasis on classification, centrifuging, filtration and fluidization. For complete information on this bulletin check No. 9263 on the coupon and mail it to this publication.

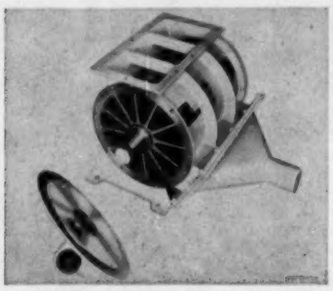
No. 9257—Truck Scale

A three-platform "Electronic Load Cell Truck Scale" that determines the load carried by each axle and computes the gross vehicle weight, without moving the vehicle, has been announced by Toledo Scale, division of Toledo Scale Corp. The scale has three platforms which can be constructed to any size requirement, but most applications call for one 24 ft. by 10 ft. and two 10 ft. by 10 ft. platforms, each supported on electronic load cells. The cells are connected to a remotely located electronic scale head. A four position platform selector switch is mounted on the scale

head. The switch connects the cells under each platform in succession to the indicating head. Thus, the load of each axle is indicated and printed. The fourth position provides an indication of the total weight. A Toledo Printweigh is provided. A truck is driven on the three platforms, with the front and center axles on the two 10 ft. by 10 ft. platforms and the rear axle on the larger platform. The operator obtains the weight by moving the selector switch to the four positions. All four readings can be obtained in less than 30 seconds, the company says. Accessories are available. For details, check No. 9257 on the coupon and mail.

No. 9259—Patented Feeder

A high pressure feeder recently developed and patented by the Day Co. is designed for trouble-free pneumatic conveying, the company says. To maintain product flow, high pressure filtered air enters hollow end bells on each end of the feeder and enters the feeder pockets near the product discharge point. The double inlet action mixes air with the product being conveyed, the company says, and this action sweeps the pockets clean and increases volumetric efficiency. Another feature of the "Air Swept" feeder,



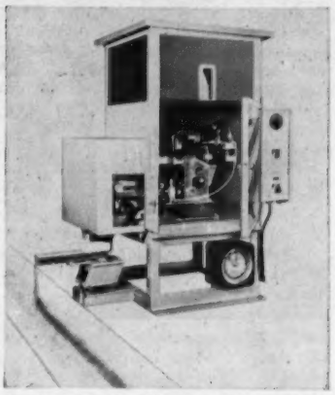
according to the company, is the way in which the air chambers keep a blanket of air between the product and the bearings, preventing contact that might gum up the bearings and the rotor shafts. For more information, check No. 9259 on the coupon and mail.

No. 9260—National Parts Service

Productive Acres Manufacturing Co., Inc., announces the formation of a nationwide parts service for bulk delivery trucks. The service ties in with the company's reconditioning and rebuilding service for owners of used bulk delivery trucks. The new Pamco parts service points are located in Oskaloosa, Iowa; St. Paris, Ohio; Jefferson, Ga.; Portland, Ore.; East Grand Forks, Minn.; Tulsa, Okla.; Austin, Texas; Tupelo, Miss.; Franklin, Ky.; Shelby, N.C., and Bridgeville, Del. For full details, check No. 9260 on the coupon and mail.

No. 9250—Weighing System

A machine for high-precision continuous weighing of loose, free-flowing granular solids has been developed by the Exact Weight Scale Co. The machine introduces a system for inserting dry additives into process-



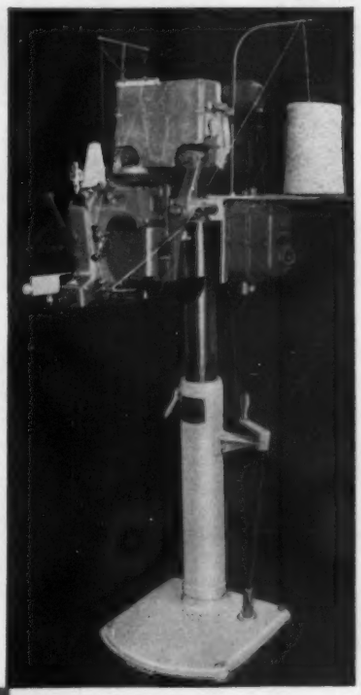
ing lines operated by conveyor, pipeline or other continuous flow meth-

ods. The unit is fully automatic in operation and is based on net weighed quantities dumped at uniform time intervals. When placed over a product stream a precision scale, with over and under indicator, weighs precise amounts of additive into a small, secondary hopper which feeds it to a vibratory feeder. It handles a wide variety of products in quantities from 1 oz. to 3 lb. and 3 lb. to 10 lb. Full information is available by checking No. 9250 on the coupon and mailing.

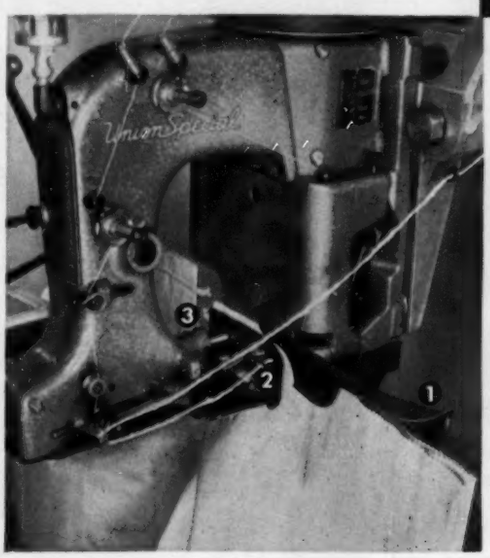
No. 9256—Elevator, Conveyor Catalog

Universal Hoist Co. announces the publication of a bound catalog and reference manual containing information on its line of bucket elevators and trough-belt conveyors. The catalog includes prices, specifications and dimensional data. For copies, check No. 9256 on the coupon and mail.

You'll get faster, uniform, trouble-free bag closing with the New Improved Bemis Sewing Machine Pedestal (with Union Special Head)



The NEW Improved Bemis Sewing Machine Pedestal is a development of Bemis Packaging Service . . . "Customer Center for Sewing Equipment."



Here's why...

❶ The Bemis E-Xpeditor Guide forms the bag top and guides it into the sewing unit at a predetermined height so the closure is *always* straight and uniform. And it does this *faster* than you would do it otherwise . . . so, *speeds production.* ❷ The Bemis Micro-sensitive Actuator automatically starts the sewing operation when the bag touches the actuator. No misses . . . no false starts . . . no unnecessary stops. In short—"No bag . . . no sew." ❸ The Bemis Automatic Mechanical Clipper cuts the thread chain at exactly the right place every time . . . thus, saves thread.

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INDUSTRY PERSONNEL NEWS

To Head Spencer Group

KANSAS CITY, MO. — The assignment of William L. Elleman as assistant to the vice president of Spencer Chemical Co.'s agricultural and industrial chemicals divisions has been announced. In his new position, Mr. Elleman will assist Byron Kern, vice president of the two divisions in coordinating and directing special projects and in developing and carrying out plans for future growth. He will make his office in Spencer's general offices in Kansas City.

William L. Elleman

Mr. Elleman joined Spencer in 1942 as a senior clerk and advanced to become the company's accounting manager. Following this, he has served in a number of executive positions, including those of administrative assistant to the president's office and assistant controller. In his new position, he will continue as president of Dura-Pak, Inc., a wholly-owned Spencer subsidiary.

●

Assistant to President

ST. LOUIS, MO. — Addison M. Smith, cost analyst for the western operations of Bemis Bro. Bag Co., has been appointed assistant to the president of the company, it was announced by Judson Bemis, president. Mr. Smith will move from the Bemis western operations headquarters in San Mateo, Cal., to the office of the president in Minneapolis. Including his years of service with the Jaite Company, of St. Helens, Ore., which was acquired by Bemis in 1941, Mr. Smith has more than 25 years of service with the company. He was office manager for Bemis in St. Helens and in Vancouver, Wash., before becoming western operations cost analyst in 1956.

Addison M. Smith

●

U.S. Borax Promotion

LOS ANGELES — Appointment of Jay B. Ford as director of administration for U.S. Borax & Chemical Corp. was announced by James M. Gerstley, president.

Jay B. Ford

Mr. Ford, a graduate of Stanford University and Harvard School of Business, joined U.S. Borax in 1947 as a sales trainee and advanced successively to the positions of salesman, assistant treasurer, assistant general manager for potash, assistant general manager for borax, and recently was executive assistant to the executive vice president, Hugo Riemer.

●

Bemis Appointment

ST. LOUIS, MO. — David I. Daily has been appointed the West Coast sales representative for the Packaging Service unit of the Bemis Bro. Bag Co., it was announced by W. J. Geimer, manager.

Mr. Daily joined Bemis in June and has been in training at the firm's packaging machinery unit in Minneapolis. He will be responsible for sales and service of all packaging equipment installed by Bemis west of the Rockies.

●

Regional Sales Director

ST. LOUIS — Appointment of L. William Sessions as regional director of sales for Monsanto Chemical Co., with headquarters in New York, has been announced by John L. Gillis, Monsanto vice president.

Mr. Sessions has held key marketing positions with the Inorganic and Organic Chemicals divisions since joining Monsanto in 1946. He has spent three years in London as special assistant for sales development of Monsanto's British subsidiary. After his return he was district sales manager at Detroit for two years and then served in the same capacity for two years in New York.

●

Hercules Appointment

WILMINGTON, DEL.—Dr. Eugene D. Crittenden, Jr., has been appointed senior technical sales-service representative in Hercules Powder Co.'s naval stores department, it was announced. In his new position he will be operating out of the department's New York district sales office.

Dr. Crittenden is a graduate of Purdue University with a B.S. in chemical engineering and received his Ph.D. in chemical engineering from the University of Pennsylvania in 1951. He joined Hercules in June of that year as a chemical engineer at the Research Center, becoming a senior technical engineer in 1953.

Three Promotions

NEW YORK—Three promotions of production personnel have been announced by R. M. Richey, general superintendent for the American Agricultural Chemical Co.

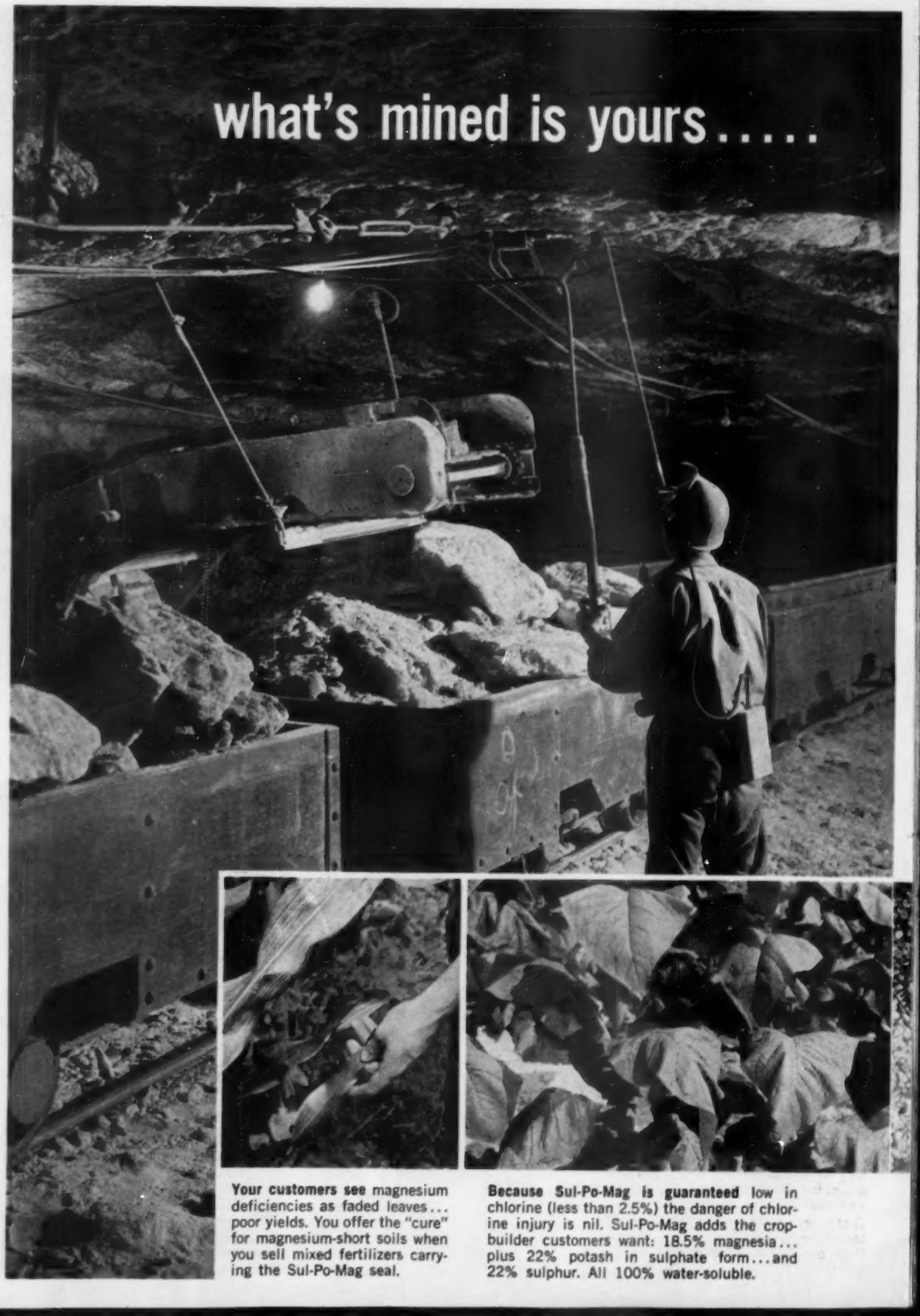
J. J. Repko has been named superintendent of production at Buffalo, N.Y. He was formerly assistant superintendent at Buffalo.

Paul J. Iten has been named assistant superintendent of production at Buffalo. He was formerly assistant superintendent at Danville, Ill.; and James W. Ryan, formerly general foreman at the company's Cairo, Ohio, plant, becomes assistant superintendent of production at Detroit, Mich.

●

Manager Appointed

DALLAS, TEXAS — Donald W. Rucks has been named manager, or-


what's mined is yours.....
Your customers see magnesium deficiencies as faded leaves... poor yields. You offer the "cure" for magnesium-short soils when you sell mixed fertilizers carrying the Sul-Po-Mag seal.
Because Sul-Po-Mag is guaranteed low in chlorine (less than 2.5%) the danger of chlorine injury is nil. Sul-Po-Mag adds the crop-builder customers want: 18.5% magnesia... plus 22% potash in sulphate form...and 22% sulphur. All 100% water-soluble.

der department of Southeastern Steel Container Co., Dallas, Texas, according to an announcement by Gordon D. Zuck, president. Mr. Rucks attended Howard College and majored in business administration. After college, he served in the U.S. Marine Corps. Prior to joining Southwestern Steel Container Co., he was assistant manager, order department, of an affiliated company, Vulcan Steel Container Co., Birmingham, Ala.

Southwestern Steel Container Co. is a subsidiary of Vulcan-Associated Container Companies, Inc., which has seven plants in the U.S. and Canada.

●

Promoted by Maas Chemical

NEW YORK — Homer W. Clinton has been promoted to the position of plant superintendent, South Gate Plant, A. R. Maas Chemical Co., division of Stauffer Chemical Co. Mr. Clinton, is a chemical engineering graduate of Oregon State College.

Niagara Scientist Retires After 37 Years

MIDDLEPORT, N.Y. — Niagara Chemical Division of Food Machinery & Chemical Corp. has announced the retirement of Dr. Harry W. Dye, plant pathologist, after 37 years of service with the company.

Dr. Harry W. Dye

During his tenure with Niagara, Dr. Dye specialized in technical service to sales. Well known to farmers and growers throughout the U.S., Canada and Central America, he was concerned principally with the technology of plant disease control, but also did considerable work pertaining to insect and weed control problems.

Importance of Pyrethrum to Economy of Africa Assures Continuation of Supplies

NEW YORK—A tour of Africa's pyrethrum growing regions was recently completed by Dr. Herman Wachs, research scientist for Fairfield Chemicals, Food Machinery & Chemical Corp., N.Y.C.

Dr. Herman Wachs

Dr. Wachs is the developer of piperonyl butoxide, synergistic chemical used with pyrethrum to produce Pyrenone insecticides. Pyrethrum flowers rank as one of Africa's major money crops. The three prime growing areas of Kenya, Tanganyika and the Congo supply approximately 98% of the U.S.' pyrethrum requirements.

Accompanied by his wife, Dr. Wachs traveled extensively throughout the growing regions followed by stops in Israel, Greece, Italy, Germany and England. African pyrethrum farms, he noted, range from typical pioneering enterprises hewn from rugged, uncultivated terrain to large pyrethrum plantations.

The typical pyrethrum farmer resembles the pioneer of America's Early West. "African farmers mainly are vigorous, friendly, hardworking and extremely hospitable people," Dr. Wachs said.

His visits with African agricultural and government officials pointed out the rapid strides being made in the continent's farm economy. Modern farming methods are being used wherever possible in the growing of both food and export crops.

Commenting on the growth of African nationalism and its possible effect on pyrethrum supplies, Dr. Wachs stated: "Leaders in the newly independent countries of the Congo and Tanganyika, as well as those in Kenya — where independence is expected—are vitally interested in fostering agriculture.

"It is apparent that pyrethrum exports to the U.S.," he stated, "will continue to have an important position in the economy of these countries."

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the superior magnesium source that gives your mixed fertilizer the ALL-SEASON ACTION for top-tonnage sales!

S·P·M PREMIUM — Quality fertilizer containing sulphate of potash obtained from Sul·Po·Mag

From the langebeinite ore of IMC's Carlsbad, New Mexico mine comes Sul-Po-Mag . . . the magnesium source that adds bonus sales-appeal to your mixed fertilizers.

Sul-Po-Mag puts the plus-factor in your products . . . adds positive protection against crop loss or reduced yields due to common magnesium deficiencies.

It's the superior magnesium source. Granular, 100% soluble (but slow-dissolving) for all-season crop-feeding action, Sul-Po-Mag doesn't leach out as quickly — doesn't have to rely on acids from roots and soils to make it available.

Sul-Po-Mag gives your mixed fertilizers the big competitive advantage. Helps you profit from the extra sales-power generated by IMC's direct-to-customer sales campaign. That's why it's easier to hit top-tonnage sales seasons with Sul-Po-Mag in your mixed fertilizers. For more information about the product and the Sul-Po-Mag sales program, write IMC, c/o the address below.

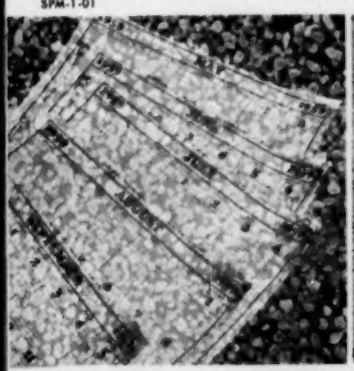
AGRICULTURAL CHEMICALS DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

ADMINISTRATIVE CENTER: SKOKIE, ILLINOIS

IMC — PRODUCTS FOR GROWTH* *TRADEMARK

SPM-1-01



More performance for the money — Sul-Po-Mag dissolves slowly. Stays available month after month to nourish the crop all through the season. One application does the job with Sul-Po-Mag in the fertilizer.

Customers would rather buy a complete fertilizer containing Sul-Po-Mag. They know the need for magnesium. They want the fertilizer with the built-in magnesium booster to carry their crops through to high-yielding harvests.

You get more sales help from IMC's nationwide Sul-Po-Mag promotion. Powerful IMC advertising . . . hard-working promotion material to sell the Sul-Po-Mag story . . . plus personal attention from IMC men — all help to move more of your product.

Canadian Group Names Officers and Directors

MONTREAL, QUE., CANADA—J. W. Thomson, sales manager of the agricultural chemicals division of Canadian Industries, Ltd., was elected president of the Canadian Fertilizer Assn. at the annual meeting of the organization at Murray Bay, Que.

J. W. Thomson

Other officers elected for the 1960-61 season were 1st vice president — William Houde of William Houde, Ltd., Laprairie, Que.; 2nd vice president—G. H. Johnson of Swift Canadian, Toronto; secretary-treasurer—R. P. Pennington, Potash Company of America, Toronto; directors: A. A. Scales, Island Fertilizer Co., Charlottetown, P.E.I.; Lloyd Hanson, International Fertilizer Co., Saint John, N.B.; Delbert Dupre, Canada Packers, Toronto; Fraser Ross, Canadian Industries, Ltd., Halifax; Alex Mooney, Canada Packers, Toronto; Donald Moffatt, United Co-operative of Ontario, Toronto, and J. C. Read, Read Fertilizers, Ltd., Elmira, Ont.

GONE WITH THE WIND

LITCHFIELD PARK, ARIZ.—The Arizona Aerial Applicators Assn. reports on the novel way a California farmer saved a 500-ton haystack which had been contaminated by drifting insecticide.

The farmer, using a ground rig, dusted a field of tomatoes with 10% DDT. At first the dust hovered over the field, but later it drifted down the road and some of it settled on the haystack.

The Pure Food and Drug Administration condemned the hay, and it looked like a 500-ton loss. However, the farmer hired a large commercial vacuum cleaner, which cleaned up the hay well enough to pass Food and Drug tests.

Population Closes in on California Plant; Dictates Move to Less Congested Location

HAYWARD, CAL. — Swift & Co.'s agricultural chemicals plant here has become a victim of the population explosion and has moved to consolidate operations for efficiency.

Swift has relocated the Hayward operations at Merced, Los Angeles, and Wasco, Cal., effective Sept. 24. E. R. Jacobs, former manager of the Hayward plant, said it would be closed down and the property disposed of.

Mr. Jacobs, who moved up to a new post as manager for California, said the move consolidated three divisions in one "for more efficient operation and production of improved products." He said the spread of urbanization in the San Francisco Bay area hastened the closing of the Hayward plant in two ways. The plant, built "in the middle of a prune orchard" in 1947, gradually became surrounded as Hayward expanded. Offices, schools and other industries now surround the site. "It became too crowded for our type of chemical process," Mr. Jacobs said.

But the urban expansion was not limited to the Hayward area. Throughout the Bay area, the rush to the suburbs ate up miles and miles of rich farmland during the last 13 years—and also ate up the market for commercial plant foods, the main product of the Hayward plant. "Most of our sales are now out in the San Joaquin Valley," Mr. Jacobs said. He indicated the Valley could be more efficiently served by the new consolidation in Southern California.

The consolidation required some "rearrangement" and expansion at the Los Angeles plant. Mr. Jacobs said that one of the reasons for the move was that the Los Angeles plant had a modern setup for granulated products, while bringing the Hayward plant up to date in that field was considered too costly.

Mr. Jacobs said some of the staff from Hayward have been transferred to the Southern California branches, while others have gone to Swift operations in other parts of the country. Mr. Jacobs himself headquarters at Los Angeles. He heads manufacturing and sales of agricultural plant foods and insecticides for California, Nevada and Arizona. C. D. Labo, manager of the Merced plant, is the new assistant manager for Northern California. H. R. Stephens has been transferred to the Wasco plant and named assistant manager for the lower San Joaquin Valley.

Products transferred from Hayward to the Southern California operations include Vigoro and Golden Vigoro, Vigoro Commercial Grower, Red Steer Grades and Golden Bear Insecticide products.

PLANT NAMING—Charles T. Harding (right), executive vice president of Virginia-Carolina Chemical Corp., was honored recently by having V-C's new concentrated superphosphate plant in Florida named for him. Here Mr. Harding confers with Florida's governor-nominee, Farris Bryant (center), and Justin Potter, V-C president, during the day.

V-C Names Plant After Charles T. Harding

NICHOLS, FLA.—A man who has given all of his adult life to the fertilizer industry was honored recently when his company—Virginia-Carolina Chemical Corp.—formally gave his name to the most modern concentrated superphosphate plant in the world.

Charles T. Harding, V-C's executive vice president who started with the company 43 years ago as a handyman in a Washington, N.C., fertilizer plant, was honored in a ceremony attended by 500 employees and others.

The expanded facility was dedicated the "Charles Tayloe Harding Concentrated Superphosphate Plant." When construction is completed around Dec. 1, the plant will produce enough phosphoric acid to make about 300,000 tons of concentrated superphosphate. A diammonium phosphate unit is also under construction. When this is completed, it will have an annual capacity of approximately 100,000 tons.

Virginia-Carolina officials hail this phosphate facility as the "most modern plant of its kind in the field." On top of this, V-C has further expansion on the drawing boards.

The entire expansion, with the exception of the sulphuric acid facility, was designed, engineered and constructed by Wellman-Lord Engineering, Inc., of Lakeland, Fla. Monsanto Chemical Co. of St. Louis designed the sulphuric acid plant and Leonard Construction Co. of Chicago built it.

Farris Bryant, the Democratic nominee for governor in Florida, was principal speaker at the ceremony held in a vast new storage addition which will hold 40,000 tons of concentrated super.

Mr. Harding was introduced by Justin (Jet) Potter, V-C president, who called Mr. Harding "a man of the employees' choice and a man who loves the employees."

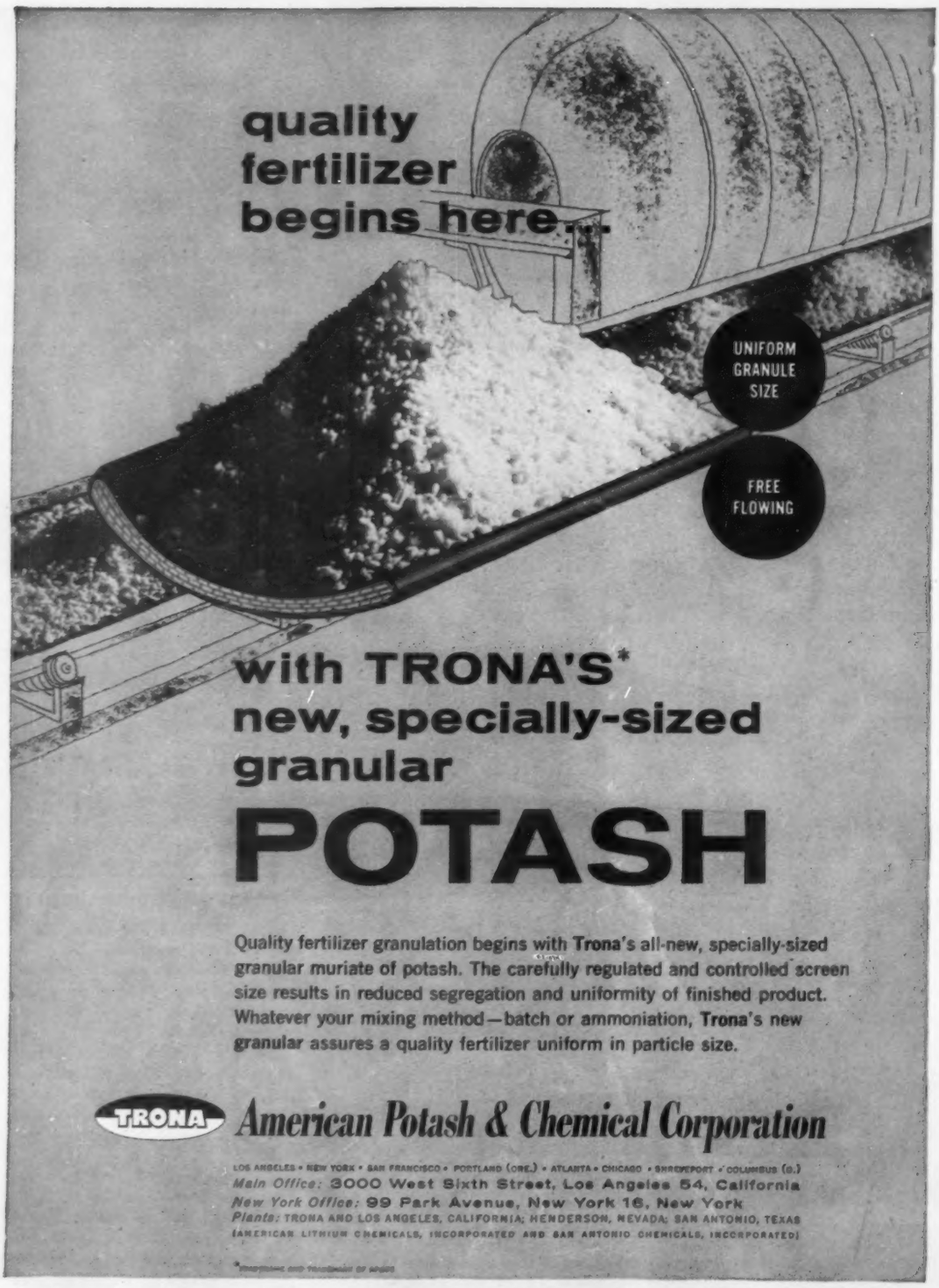
Following the ceremony, a bronze plaque and a portrait of Mr. Harding were unveiled as visitors toured the expanded plant. Mr. Harding is the only V-C employee in the firm's 65-year history to have a plant named in his honor.

PYRETHRUM SQUABBLE SETTLED

KAMPALA, UGANDA, AFRICA—All outstanding claims and disputes between the Pyrethrum Board of Kenya and East African Extract Corporation, Ltd., have been amicably settled, says a statement issued by the two organizations.

The statement adds that they will cooperate in the future development of the Colony's pyrethrum industry.

The world pyrethrum market could look to a harmonious and stable source of supply, a statement issued by the Pyrethrum Board said.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UNIFORM GRANULE SIZE
FREE FLOWING
with TRONA'S*
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Quality fertilizer granulation begins with Trona's all-new, specially-sized granular muriate of potash. The carefully regulated and controlled screen size results in reduced segregation and uniformity of finished product. Whatever your mixing method—batch or ammoniation, Trona's new granular assures a quality fertilizer uniform in particle size.
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Arcadian® News

Volume 5 | For Manufacturers of Mixed Fertilizers | Number 9

ANNOUNCING the New ARCADIAN® Solution that supplies NITRATE, AMMONIA and ORGANIC Nitrogen

DURANA*

CHEMICAL COMPOSITION %							PHYSICAL PROPERTIES		
Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Formaldehyde	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Pres. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
37.0	13.3	53.4	15.9	8.0	9.4	7.2	1.235	0	36

DURANA is a new and different ARCADIAN Nitrogen Solution created by Allied Chemical research for fertilizer manufacturers who wish to produce premium-grade complete fertilizers containing nitrate nitrogen, ammonia nitrogen, and water-insoluble organic nitrogen. DURANA supplies all these forms of nitrogen economically in one ammoniating solution containing a total of 37% nitrogen.

Through the proper use of DURANA in manufacturing mixed fertilizer, approximately 20% of the total nitrogen from the solution is converted to water-insoluble organic nitrogen in the process of producing the fertilizer. As shipped, DURANA supplies approximately 25% of its total nitrogen as nitrate nitrogen and 55% as ammonia nitrogen.

DURANA Solution is an excellent source of nitrogen for the production of premium grades, such as tobacco fertilizers and specialty fertilizers. The agronomic value of nitrate, ammonia and organic nitrogen in such fertilizers is well established. In addition to providing these three forms of nitrogen, DURANA helps give fertilizers excellent mechanical condition and facilitates the production of granular-type fertilizers.

*DURANA is a trade-mark of Allied Chemical Corporation

DURANA helps fertilizer manufacturers meet official recommendations. For example, North Carolina, Georgia and other states recommend a certain amount of nitrate nitrogen in tobacco fertilizers to get young plants off to a good start, particularly following chemical treatment of soils. DURANA supplies nitrate nitrogen plus slower-acting forms for continued healthy growth.

DURANA Solution *(formerly called Special "F" Solution)* was tested in many areas last spring with outstanding results. Production facilities are now being expanded to meet the anticipated demand for this new-type solution.

DURANA Nitrogen Solution is produced and sold exclusively by Nitrogen Division, Allied Chemical Corporation. It is a product of Allied Chemical research—the same research that originated nitrogen solutions for ammoniating superphosphate more than 30 years ago. Through the years, this continuing research has brought you many new methods and materials for making better fertilizers. For information about DURANA and other ARCADIAN Nitrogen Products, contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N.Y.

The HOW and WHY of Fluid Flow Measurement

Let's consider the rotameter. It is an apparently simple device for measuring the rate of flow of the various liquids that are used in the manufacture of mixed fertilizers. Although there are many different designs, all rotameters function in essentially the same way. Figure 1 illustrates the principal elements of a common type of rotameter.

Here are the outstanding features of the rotameter:

1. **It's a completely self-contained unit.**
2. **It measures both very small and very large rates of flow. The range from the smallest to the largest flow rate can be as great as 20 to 1, with good accuracy.**
3. **Dozens of different accessories can be added for conveniences such as remote rate indication, recording, totalizing and automatic control.**

On the other hand, the rotameter—like any mechanical device—has certain limitations—

1. **The flow rate scale is correct only for a particular fluid, at one set of specific flow conditions. Variations in specific gravity, temperature or viscosity could cause appreciable errors.**
2. **The rotameter measures *volume*, not weight. Where a liquid contains gas, the scale reading actually will be in volumes of the *mixture*, and not of the liquid itself.**
3. **Difference in pressure between the rotameter's inlet and outlet may be great enough to permit some flashing of the liquid into vapor. This, of course, would cause a false reading. The flashing can be easily prevented.**

The Key Word is "Accuracy"

A rotameter designed for measuring water at 60°F will be quite accurate over a range of temperatures from 32°F to 130°F because it requires about a 72°F variation in temperature to change the specific gravity of water one percent. Not so with other liquids; more serious errors can result from changes in temperature, specific gravity or viscosity. For example,

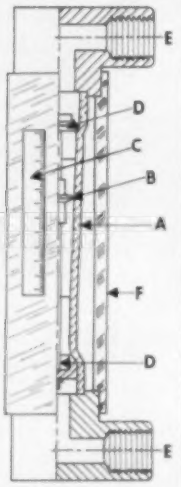


FIGURE 1

Front view of typical rotameter.
A: tapered glass tube.
B: measuring float.
C: flow rate scale.
D: stops to hold float.
E: inlet and outlet connections.
F: shield glass.

Figure 2 illustrates the marked influence that temperature exerts on the specific gravity of ARCADIAN NITRANA 2M and 3M, and ARCADIAN Anhydrous Ammonia.

NITRANA 2, 2M, 3, 3M and 7, and URANA 10, 12, 13 and 15 gain or lose about 1% in specific gravity for each corresponding 29°F change in temperature. For a similar change in specific gravity, NITRANA 6 requires about a 27°F temperature variation; NITRANA 4 and 4M, 33°F; U-A-S A, 50°F; U-A-S B, 22°F. ARCADIAN Anhydrous Ammonia is much more sensitive, requiring a mere 6°F temperature change to vary its specific gravity by one percent. The exact degree of change exerted by temperature on the specific gravity of any ARCADIAN Nitrogen Solution is always available from Nitrogen Division.

Calibrating the Rotameter

Because there are variables involved in the composition of nitrogen solutions, and in the temperatures at which they are used, rotameters must be calibrated for accuracy. One method is to have liquid flow through the rotameter at a known rate for a known time, and then check for actual volume delivered. For example, a steady flow of liquid can be maintained and caught in a bucket or drum over a period of time (measured by stop-watch). This is simple with water and some other liquids, but proves more involved with volatile liquids such as some nitrogen solutions. These would have to be measured into a weighed amount of water or into a measuring tank under sufficient pressure to retain the ammonia.

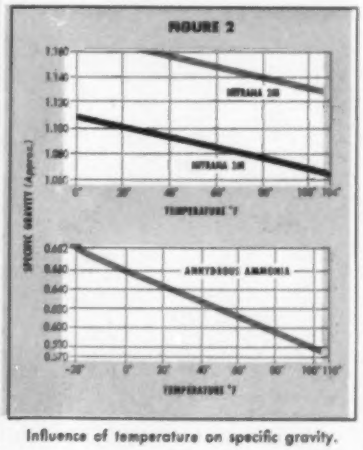


FIGURE 2

Influence of temperature on specific gravity.

In Figure 3 we have a curve that enables us to change from water calibration to calibration for URANA, NITRANA, or any other ARCADIAN Nitrogen Solution.

Let's assume that we have a rotameter which is designed for NITRANA 3, flowing at 60°F and 20 pounds per square inch gauge. The scale reads in gallons per minute at a density of 1.079, and the maximum capacity is 100 gpm. When we test the rotameter by putting enough water through it to make the scale read a steady 50 gpm, we find that in one minute we collect 52.4 gallons of water in our drum. Our calibration curve tells us that the Conversion Factor for a liquid of 1.079 density is 0.955. Multiplying the measured quantity of water, 52.4 gallons, by Conversion Factor 0.955 gives us 50.0, which checks out with our gpm setting.

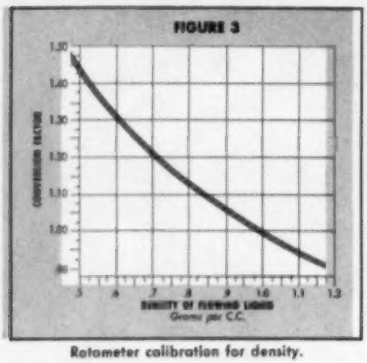
Let us suppose that another rotameter, designed for the same NITRANA 3 service, is tested and we find that we collect 54 gallons in one minute when the water flow rate reads a steady 50 gpm. Applying our Conversion Factor 0.955 again, we find that this rotameter delivered 1.6 more gallons than called for. Putting this error into percentage form ($\frac{1.6}{50}$ x 100) we arrive at 3.2%. That is, the rotameter, when in use with a liquid of 1.079 density, will deliver 3.2% more gallons than indicated by the observed flow rate. It's a simple matter, then, to apply this calibration to the gpm. rate so as to get accurate flow measurement for this particular fluid.

Viscosity affects Accuracy

The Conversion Factor curve in Figure 3 is drawn for floats made from stainless steel, and for liquids whose viscosity is not much greater than that of water. Where viscosities run higher—even up to about 10 times that of water—rotameters can still be accurate, provided that the floats are specially designed for the purpose.

Fortunately, all ARCADIAN Nitrogen Solutions have low enough viscosities at their lowest practical operating temperatures to make for satisfactory usage with practically all conventional rotameters.

ARCADIAN, NITRANA, URANA, URAN and U-A-S are registered trade-marks of Allied Chemical Corporation.



Rotameter calibration for density.

Fluids such as phosphoric and sulphuric acids, and some solutions in the industry get quite "thick" or viscous at cooler temperatures. So much so that they cause considerable error in flow measurement if they are not heated up a little to improve fluidity. ARCADIAN Nitrogen Solutions flow easily at operating temperatures.

Derivation of "CF" Curve

For those who are interested in the derivation of the "CF" (Conversion Factor) curve in Figure 3, here is the equation used:

$$F = \sqrt{\left(\frac{1}{Rf-1}\right)\left(\frac{Rf}{R}-1\right)} = \text{Conversion Factor}$$

Rf = specific gravity of the float

R = specific gravity of the flowing liquid

In order to draw a curve with the widest possible application, we have made Rf equal to 8.000, which is a fair value for stainless steel floats. If a float of other material and density is used, simply substitute the actual value for Rf in the formula.

This curve can also be used to find the Conversion Factor for fluids of different density than the one for which the float was designed. For example: suppose we have a rotameter with a float designed for use with NITRANA 3, specific gravity 1.079. The curve tells us that the Conversion Factor is 0.955. Now, if we want to use this rotameter on U-A-S A, specific gravity 0.932, we check the curve and find that F equals 1.04. Then, by computation, we find that: $CF = \frac{1.04}{.955} = 1.09$

This means that when the rotameter reads 20 gpm of U-A-S A, the actual flow is 21.8 gpm. The reason why CF in this case is greater than 1.0 is that the lighter fluid does not lift the float as high as heavier fluid would at the same flow.

If you would like more information on rotameters, or any technical problem involving nitrogen solutions, just write: Technical Service, Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

Benefits of Sulphur in Mixed Fertilizer

It pays to tell farmers about the valuable extra benefits they get from the sulphur you put in your fertilizers. They pay for nitrogen, phosphoric acid and potash. At no extra cost, you give them sulphur which is an important plant food. Many farmers are not aware of this fact. They do not realize the need for sulphur in crop production until serious deficiencies occur.

The fertilizers you make by ammoniating superphosphate are a rich source of sulphur. Normal superphosphate contains more sulphur and more calcium than phosphorus. When you use sulphuric acid to neutralize "excess" ammonia in producing high-nitrogen mixtures, you add sulphur to your fertilizer. And, of course, sulphate of ammonia in fertilizers adds sulphur. On the other hand, concentrated fertilizers made with triple superphosphate and ammonium phosphate are deficient in sulphur.

It is easy to calculate the amount of sulphur your fertilizer contains. *Make this a sales point!* Tell your customers they are getting valuable quantities of sulphur and paying nothing for it except transportation costs. This is an extra bonus.

The shortage of sulphur is becoming critical for crop production on many soils. Crops, on the average, remove about as much sulphur from the soil as they do phosphorus. Cotton, corn, tobacco, legumes, grass, onions and cabbage are heavy users of sulphur.

Crop Response to Sulphur

Field tests in many areas of the country now show definite response of crops to additional sulphur. In Western range tests with native grass, where nitrogen alone produced 1,106 pounds dry weight per acre, nitrogen plus sulphur produced 1,837 pounds dry weight grass per acre.

In Nebraska, corn has shown considerable yield improvement with sulphur. Where average yield was 66 bushels per acre, sulphur alone brought yield up to 72 bushels per acre and sulphur plus zinc increased yield to 77 bushels per acre.

Why Yellow Plants

Corn and other crops lacking sulphur often show pale yellow leaf color, similar to that in nitrogen deficiency. This is because sulphur is needed to produce the essential amino acids that go into making the protein of plant cells.

In Florida, many tests have been made on minor element deficiencies in soils. Since these elements are often supplied as sulphates, additional tests have been run with fertilizers free of sulphur, to determine what elements produced the crop response. Conclusions show that sulphur produced the following increases in yield:

Crop	Yield Increase
Cotton	35%
Corn	40%
Oats	50%
Peanuts	80%
Legumes	60%
Tobacco	40%

In some of these tests, omission of phosphorus had no effect on yield, but omission of sulphur severely reduced yields. In many other parts of the country, too, lack of sulphur in mixed fertilizers, or low per-acre application rates of such fertilizers, will reduce yields seriously in one to three years. With the present urgency to keep yields high to cut production cost per bushel or bale, sulphur should be in the fertilizer every year.

West-coast states have long been using about 750,000 tons of gypsum or calcium sulphate per year as a soil conditioner and source of sulphur. Up to now mixed fertilizers, containing gypsum in regular superphosphate, have been supplying needed sulphur in other areas. When you make high-analysis fertilizers by ammoniating superphosphate with ARCADIAN Nitrogen Solutions, you are supplying farmers needed sulphur for better yields and profits.

Per Cent of Sulphur in Fertilizers made from Ammoniated Superphosphate	
16-8-8	8.5%
15-10-10	7.6%
12-12-12	7.0%
6-12-12	7.3%
4-16-16	6.7%
5-20-20	4.0%
6-24-24	less than 1%
13-39-0	less than 1%

This indicates that sulphur deficiences will show up fast where small amounts of low-nitrogen starter fertilizers are used in the row, without top-dressing, side-dressing or plowdown of balanced mixed fertilizer or superphosphate.

It will pay you to tell dealers and farmers about the sulphur content of your mixed fertilizers. SULPHUR can be a SALES-MAKER for YOU!

Arcadian® NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
DURANA®									
DURANA is a trade-mark of Allied Chemical Corporation.	37.0	13.3	53.4	15.9	9.4	7.2	1.235	0	36
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	-108

*DURANA contains 8% formaldehyde.

Other ARCADIAN® Products: URAN® and FERAN® Solutions • Ammonia Liquor • N-dure® A-N-L® • Ammonium Nitrate • UREA 45 • Nitrate of Soda • Sulphate of Ammonia

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

NITROGEN DIVISION

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ENCAPSULATION

Continued from page 1

either a powder or tiny granules. Further, the process for "filling" NCR capsules is chemical in nature and entirely different from the method used for the old familiar type of capsule. At NCR, the capsule wall material is literally formed around the tiny particles of the enclosed substance by a chemical procedure.

The National Cash Register Co. of Dayton, Ohio, in whose research laboratories these capsules were developed, holds patents* on the original process and its capsular product, and has a number of applications for patents on further developments which widen the fields of use and increase the versatility of application.

For fields beyond its own business interests, NCR has adopted a liberal licensing policy. To aid prospective licensees, it conducts feasibility studies on the application and use of its capsules for new substances and in new environments. In the few years since the first publication concerning these capsules, numerous industrial research organizations have submitted materials for encapsulation to meet a wide variety of product formulation problems, where the desire to enclose or confine a material suggested the use of NCR capsules. (Many such uses had already been foreseen by NCR, but no single group can visualize all of the situations where encapsulation is desirable, because they seem to be almost without limit. NCR therefore solicits inquiry from all who have such situations.)

*U.S. Patents No. 2,800,457 and 2,800,458; also Nos. 2,712,507; 2,730,456, and 2,730,457 dealing with the now familiar "NCR Paper" that has displaced carbon copy paper in many areas.

Encapsulation Use

Enclosing or confining a substance is desirable for a number of quite different reasons. NCR capsules were developed originally to contain a colorless dye which, upon contact with a suitable reagent, gives a color. The dye-containing capsules were of such minute size that they could be applied invisibly to the back of a sheet of paper that was placed in contact with a copy sheet containing an activating reagent. Ordinary writing or printing pressure on the top sheet ruptured the capsules to release the dye, which then colored the copy sheet along the line of rupture and gave an exact copy of the writing.

Similarly, one can "lock-up" other chemical reagents until the occasion for reaction or for some pre-reaction step occurs, whereupon the reagent can be released and given access to a desired co-reactant or solvent or other vehicle. Catalytic compounds are another type that often are desirably encapsulated to separate them from the reagents to be catalyzed. Speaking more generally, these capsules make it possible to keep two or more substances physically separated, even though they may be intimately mixed, and then if desired, the encapsulated substance or substances can be released to play some role upon contact with an associated substance.

In other situations, the wish to confine a material stems from its volatility and its resulting tendency to escape, or from its instability in the presence of air or of other substances with which it is closely associated. Examples are perfumes and flavors which often have to be incorporated in products in excess quantity, at wasteful cost, in order to provide enough at the time of use, or which undergo chemical change during storage and either impose costly limitations upon shelf-life or else fail to deliver their best at the time of use. In the field of drugs, a number of desirable formulations have been difficult or impossible because of the instability of certain components or because of their incompatibility with other components. Encapsulation protects such components until released at the desired time.

Somewhat analogous cases are those in which a material is enclosed because it is in some way antagonistic to the environment in which it is used, or through which it passes during handling or storage. This situation arises, for example, with substances that are toxic or allergenic upon contact with the skin or tissue, as well as with substances that have an unpleasant or otherwise undesirable color or odor or flavor that calls for masking.

This sort of enclosure is desirable also where there is a wish or a need to control the rate at which a particular substance is made available at

HOW CAN IT BE USED?—Feasibility studies in encapsulation are an important part of laboratory work under way at National Cash Register Co. laboratories. Scene above pictures portion of NCR laboratory.

Accurately Blends and Spreads 3 Fertilizers at Once!

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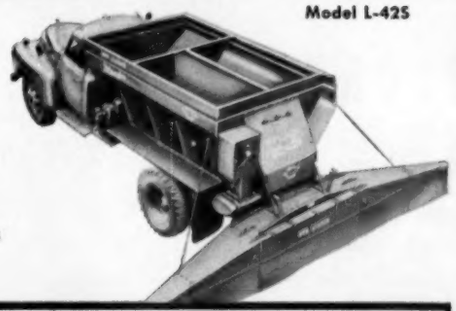
Model L-425

- Lets you offer mixed analysis at lower, bulk rates!
- 3 Separate compartments!
- 36" Conveyor synchronized to speed of truck by drive shaft drive!
- 7.0 H.P. Engine drives Twin Spinners!



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the site of its use. For such repository and dispensing purposes the encapsulating material must be one which permits a control of the rate of release. NCR capsules meet this demand in either of two ways.

Less familiar probably are the cases where encapsulation of liquids is desirable in order to put the whole material in apparently solid form. An example is the encapsulation of liquid fuel. NCR capsules lend themselves to this because they can be made sufficiently durable to withstand ordinary conditions of packaging, shipping, mixing and the like, and because they can form either a free-flowing granular material, or a coalesced or caked mass.

Still another occasion for encapsulation of minute units arises in the case of products that are desirably sold as dry concentrates, to be reconstituted by mixture with water or some other liquid solvent or vehicle into which the confined material can be released.

Encapsulation yields the seeming paradox of making soluble materials non-soluble; or making extractable materials non-extractable and of giving other reversals of properties, such as letting miscible materials be mixed without dissolving.

This does not pretend to be an exhaustive listing of occasions, or even types of occasion, which call for the encapsulation of a material or mixture of materials whether solid or liquid, and which, therefore, suggest the use of NCR capsules or a study of the feasibility of their use.

Any statement on the subject would, however, fail to be up-to-date, as well as incomplete in one of the most interesting aspects of this subject, if there were not at least a mention of a new development which has created occasions for industrial and scientific use of NCR capsules. The capsule can serve as a unit vessel in which a chemical or physical change can be made to occur upon subjecting the nucleus to forces transmitted through the capsule wall, without rupture of the capsule.

The change brought about, or its effect, may itself be the desired end result, as in the case of a change in color or in optical properties, or it may be a preliminary to some further step to be effected upon release of the nucleus material in its thus altered condition. For example, the nucleus or one of its components can be made to respond to the application of radiant energy, such as magnetic, sonic or photo energy, transmitted through the capsule wall. Similarly, the substance susceptible of such change can be incorporated in or on the capsule wall, and such a system can be used either alone or in conjunction with a nucleus substance that is alterable in one of these ways.

Properties and Capabilities

The versatility of NCR capsules which gives them their wide range of uses stems not only from good physical properties, but from their ability to control those properties and to adapt them to differing needs. Among the controllable variables are capsule size, nucleus material, wall material, wall strength, wall permeability, wall additives, mass state, and the means and rate of release of the nucleus where desired. These variables make it possible to tailor the capsules to fit the particular case, as well as to produce mixtures of capsules differing in their properties where that is desirable.

There are also numerous other ways in which control of release of encapsulated materials can be accomplished. Application of such external forces as heat, light, ultrasonics, and impact can be made, under such conditions as lend themselves to the desired time and mode of release.

Industry Applications

It is believed that the characteristics of NCR micro-capsules as described here can be adapted to preparation of improved types of insecticides, herbicides, fumigants, fungicides, feeds, and animal drugs. These improvements include reduced handling difficulties with toxic or unpleasant materials, masking of offensive odors and tastes, prolonged action at application sites, and delayed loss of volatile materials.

Toxic materials can be encapsulated so as to appear as free-flowing powder even though containing 80% or more active material; pesticides can be mixed with fertilizers; animal drugs can be added to feeds or drinking water, with the dual property of absence of taste or odor, and delayed or prolonged action. The capsule wall material is edible, tasteless, and nontoxic.

Insecticides

The main problem encountered with insecticides is in handling inherently toxic materials. By encapsulating these materials, handling problems are greatly decreased. Controlled release properties can be built into the structure if needed.

Herbicides

Herbicides are frequently very volatile materials, often quite offensive to the eye and throat. Storage life is usually short. Encapsulation will increase the ease of handling of such materials. Again, sustained or controlled release properties are often desirable. Also, encapsulated materials can be mixed with seeds or fertilizers, thus eliminating an additional application step.

Fumigants and Fungicides

The ability to convert liquid fumigants to "solids" without loss of the properties of the original liquid is all-important in this area. Doing so not only provides ease of handling, but actually protects the chemical until it is needed in the soil, etc. Novel application techniques are provided in that the fumigant can be mixed with fertilizers, thus saving an application step.

Stabilization of feed additives is also provided by encapsulation. Trace additions of drugs and vitamins can be made in a controlled manner. Many vitamins are incompatible with other materials used in feed formulation. The capsule provides a physical barrier, keeping the incompatible materials separated in the feed.

The NCR encapsulation process can provide taste and odor masking for drugs, thus making them more acceptable to animals. Sustained or controlled release can be built into the structure. The drugs protected by encapsulation can actually be dispersed in the animals' drinking water to insure adequate dosage. ▲▲

Latest Rulings in Labor Relations

MUST EMPLOYER POST NEW JOB OPENING BEFORE HIRING ?

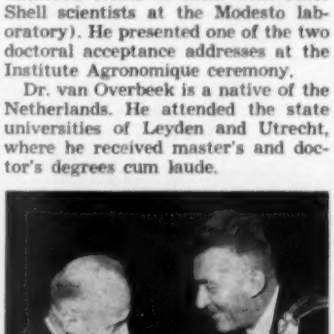
WHO'S THAT FELLOW!
THEY'VE EXPANDED J.C.'S DEPARTMENT
HEY, WAIT A MINUTE!
THAT JOB SHOULD BE POSTED SO I COULD BID FOR IT!
IT'S NOT A VACANCY BUT A NEW JOB!
OUR CONTRACT CALLS FOR BIDDING ON JOB VACANCIES!
NO VACANCY AS SUCH EXISTED!
ARBITRATOR'S DECISION
YES, ANY JOB OPENING IS CONSIDERED A VACANCY
Based on a 1960 Decision

American Honored by Belgium Institute

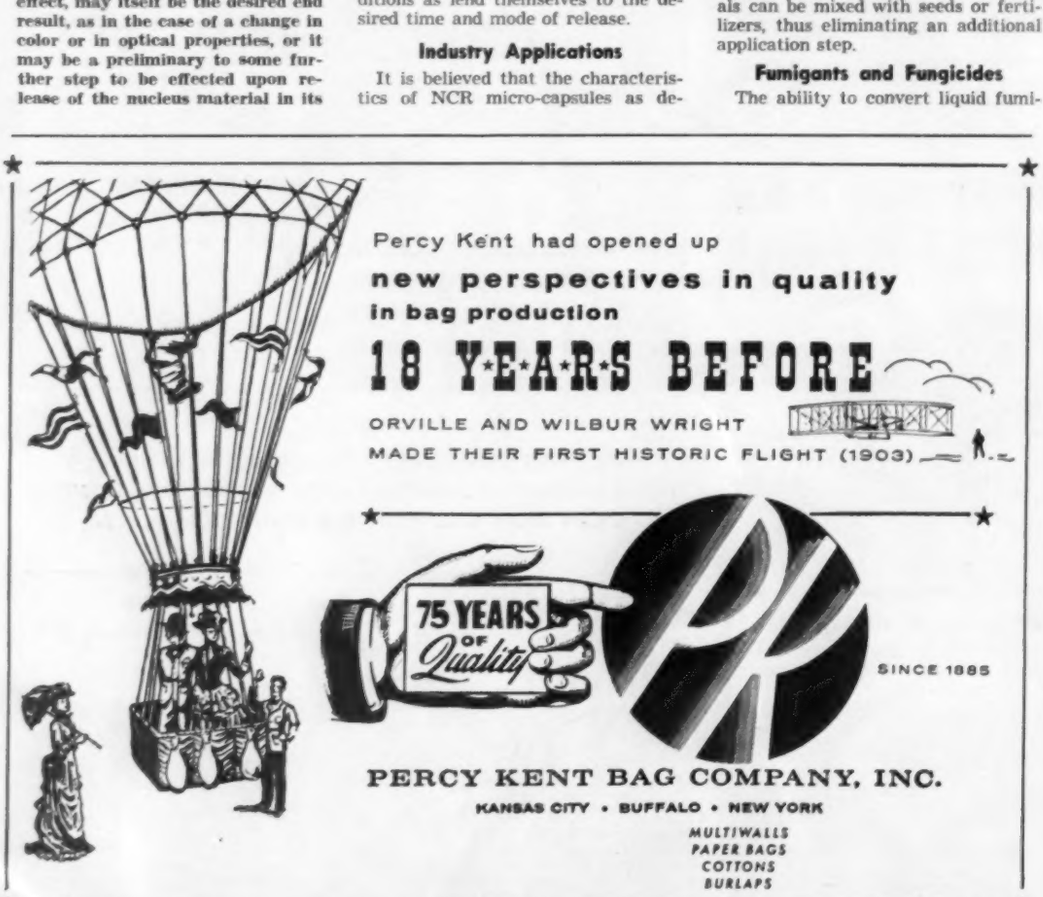
SAN FRANCISCO, CAL. — Dr. Johannes van Overbeek, chief plant physiologist at Shell Development Co.'s Modesto, Cal., agricultural research laboratory, has been awarded an honorary doctor's degree in agricultural science by the Institute Agronomique de l'Etat at Gembloux, Belgium. The ceremony marked the institute's centennial celebration. Among others honored on the occasion was His Majesty, King Leopold III, of Belgium.

Dr. van Overbeek was selected for the honor because of his distinguished career in agricultural research and for the more than 75 scientific publications which he has authored or coauthored (some of them with other Shell scientists at the Modesto laboratory). He presented one of the two doctoral acceptance addresses at the Institute Agronomique ceremony.

Dr. van Overbeek is a native of the Netherlands. He attended the state universities of Leyden and Utrecht, where he received master's and doctor's degrees cum laude.



HONORED ABROAD—Dr. Johannes van Overbeek, at right, Shell Development Co., Modesto, Cal., receives honorary doctor's degree in agricultural science from Prof. A. Lecrenier at Gembloux, Belgium, recently.



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Building bigger profits for your customers by supplying this vital element in your alfalfa mixes can also build bigger profits for you. Millions of acres of alfalfa need boron *every* year. So, take advantage of this major market for a minor element. Always consult your state agricultural authorities for specific amounts to use.

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Boron-hungry Alfalfa . . . Dwarfed . . . with yellow or reddened top leaves, stunted; growing tips rosetted. These are nature's distress signals calling for boron.
Top-quality Alfalfa . . . Fertilized with boron, grows lush and strong — provides maximum yields with increased profits. Such vigorous growth shades out weeds and results in longer life stands.

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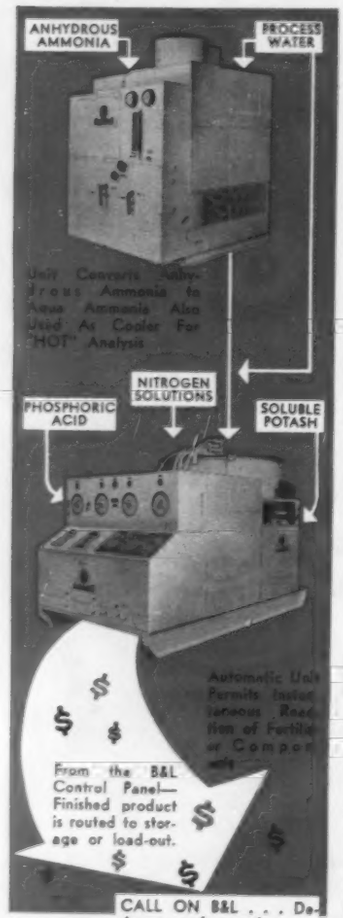
Becoming a full scale manufacturer of complete analysis liquid fertilizers is profitable—and easy with the B&L plan. Learn about this *new* business . . . for yourself. Send for data—today.



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Clean, Neat Clothes on Workers Adds to Plant Efficiency, Raises Morale

By Joseph Kirshbaum*

DRESSED TO KILL—This workman, loose and ill-fitting clothing and all, is inviting trouble whenever he steps near moving machinery. Clean and well-fitting work outfits should be part of plant policy from standpoints of efficiency, safety and morale.

ONE IMPORTANT—and frequently overlooked—area in the field of safety, is work clothing. Everyone has heard the expression, "dressed to kill." In the agricultural chemical industry, with its special hazards, this expression can have a sinister and dangerous meaning.

The plain fact is that far too many workers report on the job wearing unsafe clothing. The interest of the production staff, plant engineers, superintendents, works managers and foremen in this problem is obvious. Accidents these days can be enormously expensive, with high compensation claims becoming commonplace.

Dirty, nondescript work garments worn on the job may have plenty of "built-in" accident hazards. Old, worn-out street clothing "not good enough for anything else" is definitely not good enough for men to wear to work. Such garments are almost certain, sooner or later, to be contributing factors to accidents. Work clothing plays a far more prominent role in on-the-job safety than has frequently been appreciated.

Seven "deadly sins" of work garments that can lead to health hazards or costly accidents are:

1. **Dirty garments**—which can cause skin diseases and rashes, provide a chance for bacteria to infect minor cuts, burns.

2. **Oil or chemical-soaked clothing**—which can easily turn a workman into a human torch.

3. **Missing buttons**—which can leave a dangling cuff free to catch in moving machinery . . . and pull the wearer in after it.

4. **Cuffs on trousers**—which can catch on projections and lead to crippling falls.

5. **Loose or ill-fitting garments**—can catch on projections and lead to falls, or become entangled in machinery.

6. **Poorly maintained garments**—rips, tears and missing buttons are a safety hazard. Garments should be kept in good repair at all times.

7. **Loose belts, dangling ties, fancy or ill-designed features on work clothing**—can catch in machinery and constitute a safety hazard in other ways.

What about the selection of the right work uniform for employees? This is not always as easy as it may seem. Uniforms should be practical and selected carefully, with due consideration of the on-the-job conditions.

Sometimes it is possible to make mistakes. An example is a large company which selected a uniform modeled after that worn by a five-star army general—and did the general several points better by tacking onto the uniform a number of gaudy, "fruit salad" features which, the company executives thought, would improve its appearance.

The uniform simply wasn't suited to on-the-job conditions. It could not be laundered but had to be dry cleaned. Under the company plan, the employees were supposed to have this done very frequently at their own expense. The men resented the high cost of dry cleaning the uniform. Some wore it for weeks—even months—without cleaning. Others tried to launder it in the family washer, with disastrous results. Soon most of the employees looked like fugitives from Skid Row. The uniform was abandoned with considerable financial loss.

Had this company had the benefit of impartial advice in making the purchase, this could easily have been avoided.

After long experience and years of observation, the Institute of Industrial Launderers has come to some very definite conclusions about uniforms. They are:

1. **Cotton** uniforms are usually the best for most purposes. They stand up better, can be laundered inexpensively and easily, and maintain their good looks.

2. **Standard colors,** of which there is a wide selection, are best for most work uniforms.

3. **Fancy, "fruit salad" features should be avoided.** They may look fine at first but are often impractical, cause problems in laundering, and their over-all effect on the uniform is nearly always detrimental in the long run. In addition, such features are often costly.

4. **Eye appeal** and **company identification** can easily be obtained by the use of attractive, well-designed company emblems. These, used with the standard color uniform, focus the eyes of the viewer where they should be—on the emblem, which carries the company's identification.

5. **Drivers,** dealing with the public, should always be in uniform, and the uniforms should always be clean and attractive. Thousands of persons are likely to see these drivers in the course of a week.

6. **Group identification.** In the large fertilizer and pesticide plant, it could be helpful to dress foremen in a uniform of a slightly different color than other employees. This identifies them immediately. Sometimes it is helpful, in larger plants, to dress employees of different divisions or sections in slightly different colored uniforms. (Then if anybody is out of place, loafing, or where he shouldn't be, it is immediately apparent.)

7. **A uniform should be tested** to see how long it will hold up. It should be laundered several times under the actual conditions it is likely to meet. Then factors such as shrinkage, color fastness or tensile strength loss can be observed.

*Mr. Kirshbaum is president of the Institute of Industrial Launderers, Washington, D.C.

Ammonium Nitrate Booklet Recommends Safe Procedures

WASHINGTON — Recommended procedures for proper packaging, handling, transportation and storage of fertilizer grade ammonium nitrate have been compiled by the Manufacturing Chemists' Assn.

The 24-page illustrated booklet, prepared by experts in the ammonium nitrate production and regulatory fields, carries the fertilizer grade compound from the manufacturing process through to its ultimate handling on the farm. The manual applies only to fertilizer grade ammonium nitrate. It does not cover blasting agents in which ammonium nitrate is only a component.

The association states that under normal circumstances and with simple precautions fertilizer grade ammonium nitrate is completely safe and cites the fact that "A thorough review of the experience in handling millions of tons of the material by rail, truck, ship and in warehousing, has demonstrated that this product can be handled with complete safety if the recommended procedures are observed."

In addition, the booklet emphasizes that extreme caution should be exercised to avoid contamination of the product with foreign matter, particularly organic materials.

Inasmuch as fertilizer grade ammonium nitrate is somewhat corrosive, the manual recommends that farmers and other consumers thoroughly clean out all application equipment as soon after use as possible.

The manual states that detailed investigation of fires involving fertilizer grade ammonium nitrate "failed to indicate that any of the fires were caused by spontaneous heating of the ammonium nitrate." In addition, MCA says, "Investigations of all commercial and farm storage fires do not reveal a single case in which an explosion of fertilizer grade ammonium nitrate occurred."

The association says, "As in the case of any oxidizing agent which stimulates the burning of combustible materials, fertilizer grade ammonium nitrate deserves common-sense treatment."

The manual, which is a revision of a similar booklet published in 1950 by the association, is available at the MCA office in Washington for 50¢ a copy.

Granular Production and Formulation Rate High Among Industry's Technical Problems

CHICAGO—That the most persistent technical problems facing the fertilizer manufacturer today are those involving semi-granulation, formulation and granular production, was the conclusion reached after tabulation of service calls for the early months of operation of the recently organized technical service staff of International Minerals & Chemical Corp. The reports are regarded by the staff as a reliable barometer of the industry's technical problems, coming from five technical service regions covering the U.S. and Canada east of the Rocky Mountains.

Richard G. Powell

General service calls, with no one problem standing out, accounted for 113 of the total of 445. The remaining 332 were divided as follows:

Semi-granulation	50
Formulation	48
Granular production	42
Equipment and production	37
General production	37
Product service call	30
Pan granulator	18
Liquid fertilizer	17
X-O-X production and preneutralization	16
Bulk blending	16
Acidulation	14
Specialty grades	7

Problems in semi-granulation, which headed the list with 50 calls, have multiplied as smaller plants seek to meet the competition of the fully granulated plants, in the opinion of Richard G. Powell, IMC manager of technical service.

"Semi-granular units generally are installed as stop-gap measures to let the owner decide whether to go ahead with investment in the more expensive full granulation unit," Mr. Powell explained. "The conversion of a plant producing pulverized fertilizers to semi-granular operation provides problems in particle sizes, nitrogen losses and other areas."

He noted that formulation problems, second highest at 48, most frequently cover two categories — the most economical way of formulating for the exact product desired, and the avoidance of off-analysis materials through losses and overages. Trained technical service men have been very successful in assisting in all areas of formulation.

Granular production, next in line with 42 requests, is tied closely to formulation, he noted. Granulating unit owners constantly seek a minimum of recycling and maximum of on-size materials to get the most from their equipment.

The classifications "general production" and "equipment and production" were differentiated in that the former refers to a complete re-evaluation of the entire production system of a given plant; the latter indicates that technical service was called on regarding a specific piece of equipment and its relation to the production problem.

IMC's technical service department currently is working on two relatively new concepts, Mr. Powell explained.

One is an attempt to categorize and "can" certain information which seems to be requested most frequently. For example, when a fertilizer manufacturer requests help on material handling systems, unit operations, types of buildings and other subjects, all pertinent information would already be packaged.

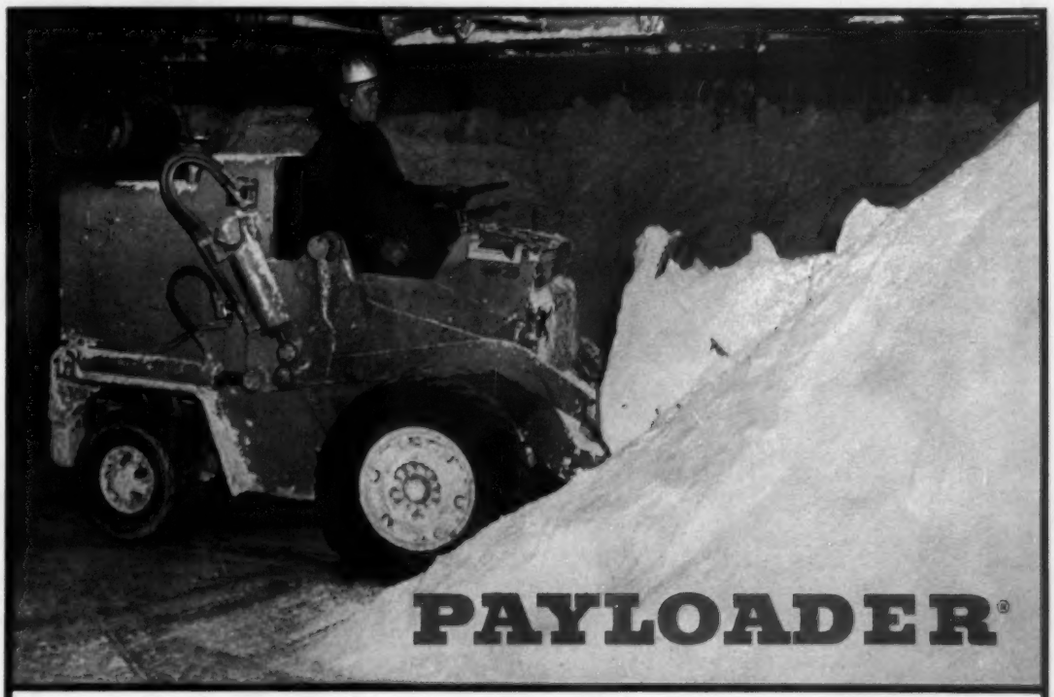
Proposed layouts, cost estimates and other vital data would be supplied immediately upon request. Even when individual cases varied slightly, the "canned" information would provide a starting point and would move the problem to solution more quickly.

The second new step is the previously announced series of fertilizer training clinics to be conducted in 11 cities this fall by IMC.

More than 400 representatives of fertilizer manufacturing companies are expected to attend. Schedule of meetings:

Oct. 24-25, Minneapolis; Oct. 26-27, Indianapolis; Nov. 9-10, Baltimore; Nov. 14-15, New York City; Nov. 16-17, Raleigh, N.C.; Nov. 21-22, Toledo, Ohio; Nov. 28-29, Winter Park, Fla.; Nov. 30-Dec. 1, Montgomery, Ala.; Dec. 5-6, Kansas City; Dec. 12-13, Tyler, Texas; Dec. 14-15, Jackson, Miss.

NEW PHOSPHORIC PLANT—More than 2,500 persons attended the September 1 open house at The Bunker Hill Company's new phosphoric acid plant at Kellogg, Idaho. Built as "a logical step in diversifying our economic base," according to C. E. Schwab, newly-named president of the mining firm, the plant was completed early this summer but will not go into operation until a strike by the Mine-Mill union against the firm has been settled. The $2,000,000 plant has a capacity of 130 tons of phosphoric acid daily.



What users say about the H-25..

The success of the H-25 "PAYLOADER" can best be gauged by what owners and operators of this tractor-shovel say about it. Here are typical comments from users in foundry, chemical, ceramic, paper, and other industries.

Power and Capacity: "Gives nearly twice the production of our old HA's . . . good digging power and traction, fast lifting power. The most efficient we've ever used — outperforming larger loaders." "Before purchasing the H-25 we had competitive demonstrations that proved its production efficiency over other machines."

Speed and Maneuverability: "Is quicker on the lift, dump and go than the . . . . . — is more compact . . . gets into smaller places easier and faster." "Is doing a top production job. Power-steer and power-shift combination gives us maximum efficiency from both the machine and the operator."

Easy Operation: "The H-25 is a dandy with its power-steer and power-shift — gets full loads without spinning wheels and the operator lasts longer too." "I like the maneuverability and work capacity."

Reliable: "We find they stand up under tough rugged duty with minimum repairs." "The low maintenance on the H-25's has been way superior to any loader previously used. It's a real producer, easy to service." "Gives maximum production output under ideal *or* adverse conditions."

The satisfaction being delivered by the 2500-lb. capacity model H-25 is a reflection of the kind of performance built into *all* "PAYLOADER" units. There are 20 models in 8 capacity ranges — up to 12,000 lbs. operating capacity — to meet your needs, and a nearby HOUGH Distributor to serve you. He has the finest parts and service facilities, backed by factory service personnel to keep your "PAYLOADER" investment profitable.

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9-A-1

PRODUCTION PROCESS PATENTS

2,951,755

Fertilizers and Method of Making Same. Patent issued Sept. 6, 1960, to Jacob S. Joffe, New Brunswick, N.J., assignor of 33⅓% to George S. Pfaus, Hopewell, N.J., and 33⅓% to R. A. Posner, New York. A method of making an organo-mineral fertilizer from natural organic fertilizer material which contains original humates and added water-soluble mineral fertilizer, said organic fertilizer material having original water-soluble colloidal material; which consists in adding gypsum to said organic fertilizer material while said fertilizer material has enough water to react its original humates with said gypsum to form a modified fertilizer material which has calcium humates; the weight of the gypsum being substantially 2.5% to 3.0% of the weight of said organic fertilizer material; heat-drying said modified fertilizer at substantially 1800° F. to produce a heat-dried fertilizer material whose percentage of water is sufficiently low to make said heat-dried fertilizer material stable to live micro-organisms; said heat-drying converting a major part of said colloidal material permanently to the water-insoluble state; granulating said heat-dried fertilizer material in the form of small particles with finely-divided and water-soluble mineral fertilizer and added water to form a final product which consists of granules; and forming organo-mineral gels of said heat-dried fertilizer material and of said mineral fertilizer in said granules during said granulating; providing said granules with coatings which are semi-permeable to water when said coatings are dry, said coatings being initially formed by applying a coating composition to said granules; said coating composition consisting substantially of water and ammonium nitrate and a water-soluble adhesive and said heat-dried fertilizer product in fine-particle form; and heat-drying said wet-coated granules at substantially 100° C. to 150° C. to ignite some of said ammonium nitrate and to char the dry granules and to provide the above-mentioned coatings which are semi-permeable to water in the dry state, said heat-dried and coated granules having a sufficiently low percentage of water to be stable to live micro-organisms.

2,951,753

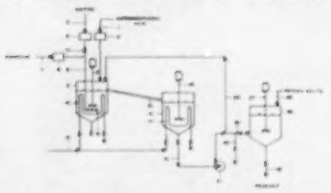
Method of Making Soil Conditioning Materials. Patent issued Sept. 6, 1960, to Kenneth D. Groves, Bryn Mawr, Pa., assignor to American Viscose Corp., Wilmington, Del. A method of making a soil-conditioning material which comprises impregnating a dilated non-fibrous pellicle of a water-insoluble hydrophilic film-forming material with a liquid medium comprising an auxiliary soil-conditioning agent, drying the pellicle, and reducing the pellicle to a mass of particles having the auxiliary soil conditioning agent intimately associated therewith.

2,951,754

Alpha, Beta, Beta prime-Trichloroisobutyric Acid and a Process of Eradicating Plants With Functional Derivatives Thereof. Patent issued Sept. 6, 1960, to John R. Bishop, Hatfield, Pa., assignor to Amchem Products, Inc., Ambler, Pa. A process of eradicating undesirable plants comprising applying to the plants, a compound selected from the class consisting of alpha, beta, beta prime-trichloroisobutyric acid, its alkali metal salts, its ammonium and alkyl and alkanol amine salts, its alkyl esters, its monoethylene glycol ether esters, its diethylene glycol ether esters, its poiyethylene glycol esters and its tetrahydrofurfuryl ester in a concentration and amount sufficient to eradicate the plants.

2,950,961

Production of Liquid Fertilizers. Patent issued Aug. 30, 1960, to Marcus M. Striplin, Jr., Florence, Ala.; John M. Stinson, Sheffield, Ala., and John M. Potts, Florence, Ala., assignors to Tennessee Valley Authority. A process for preparing a liquid mixed fertilizer having a total plant-food content above 33 weight percent



which comprises introducing water, ammonia, and superphosphoric acid into a reaction zone; therein rapidly and intimately mixing them; controlling the proportions of water, ammonia, and superphosphoric acid introduced so that the pH and specific gravity of the resulting solution are in the ranges from 5.0 to 6.65 and from 1.26 to 1.45 at 80° F., respectively; maintaining the temperature of the solution in the range from 55° to about 125° F. during mixing, and withdrawing a stable fertilizer solution containing from 33 to 60 weight percent total ($N+P_2O_5$) from the mixing zone.

2,950,183

Nutrient Spray Composition for Plants. Patent issued Aug. 23, 1960, to Alexander A. Nikitin, College Park; Charles C. Fite, Jr., East Point, and Janet Segers Gary, Union City, Ga., assignors to Tennessee Corp., New York. A nutrient spray for application to growing plants comprising an aqueous solution of ammonium phosphate and oxalic acid in the proportions of from 8 to 28 parts by weight of oxalic acid to 100 parts by weight of diammonium phosphate and said solution having a pH in the range of 6.1 to 7.0, said solution also containing as trace metal supplements

Turn to PATENTS page 26

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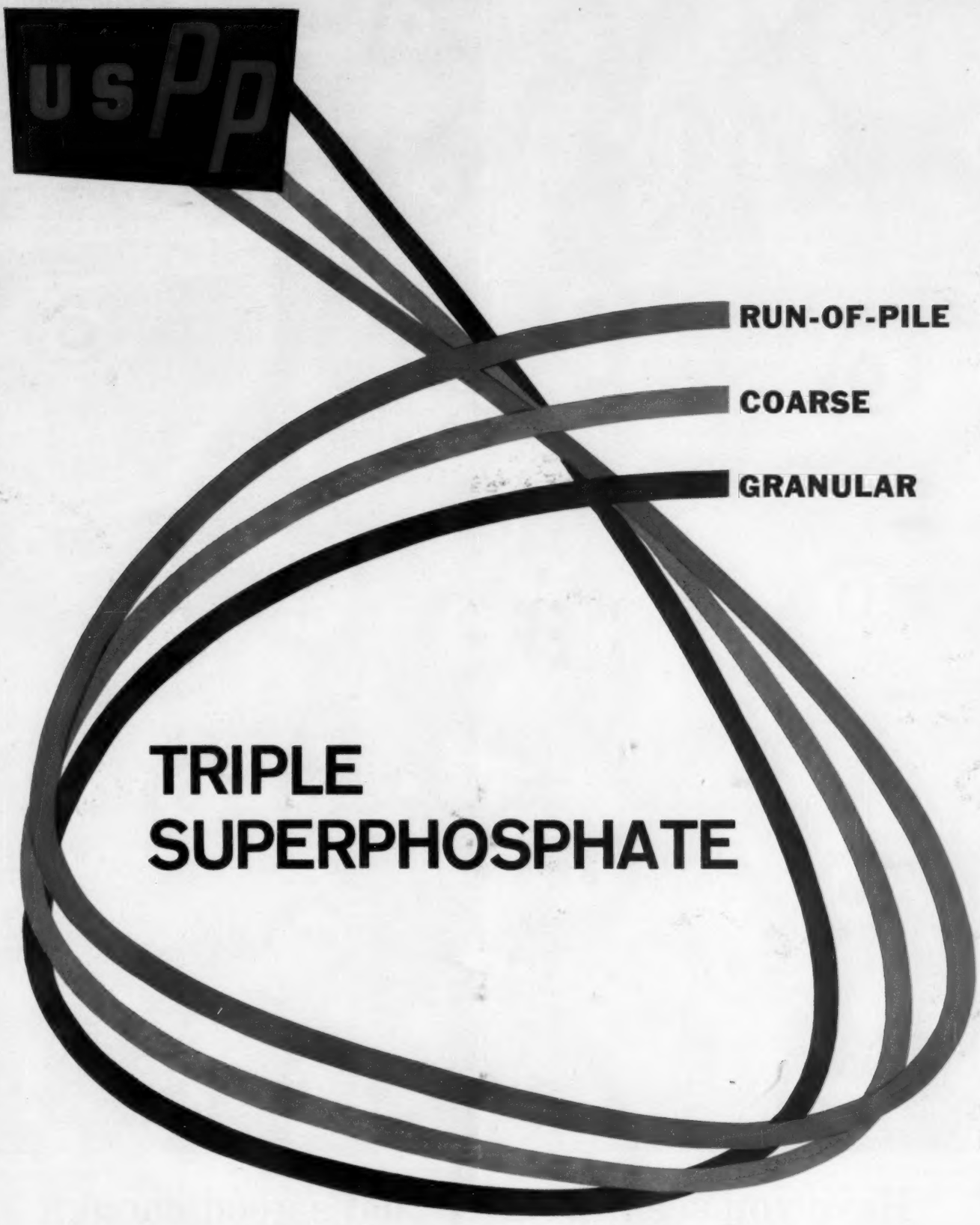

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HURRICANE

(Continued from Page 8)

to the depth of five or six feet," Mr. Griffin said.

Preparation for the big blow was credited in many cases for the relatively low level of damage done to various plants. "Hurricane Donna caused considerable damage but more in the agricultural field than damage to buildings," reports R. S. Rydell, vice president, Smith-Douglass Co., Inc., Norfolk, Va. "We were fairly well prepared for the storm at our Plant City, Fla. operation, having shut down the entire plant previously. We lost a lot of nice trees, but that was about the extent of the damage there.

"At the mines in Lakeland, Fla., we were affected mostly by water, the pits being completely filled and power being cut off. Electric power was resumed on Sept. 13 and mining operations were back in full operation the next day."

Mr. Rydell said the railroad between the Smith-Douglass mine and Auburndale, Fla. was washed out, which prevented the company from shipping phosphate rock for a short time. "However, here in Norfolk, we had no particular damage. A few shingles were blown off the roof and off the siding of the plant. No actual damage was done to our products.

"We had more damage here at the office than anywhere else. Although there was no damage to buildings, we did lose 17 beautiful trees surrounding the office. All in all, we took the storm very well. In fact, much better than we did Hurricane Hazel a few years ago."

A spokesman for E. I. du Pont de Nemours & Co., Wilmington, Del., stated that none of the DuPont plants were in the path of the hurricane. "Although we had the same high winds and rain the rest of the east coast had," said J. J. Burchenal, of the DuPont Public Relations Dept., "operations at DuPont's Grasselli plant at Linden, N.J., were interrupted only briefly by high water, but production of agricultural chemicals was not affected."

A Long Island operator reports that heavy rains, between five and six inches, failed to damage crops extensively in his area. Hugh H. Benjamin, of Long Island Produce & Fertilizer Co., Riverhead, says that quite a number of "nice shade trees" were lost and quite a number of farms were completely without electricity for a considerable period of time. He says the damage in Suffolk County will be considerable, especially along the waterfront, but as for agriculture, losses were not as large as expected.

A happy note was sounded by reporters in the Savannah, Ga., area. F. H. Emerick of Southern Nitrogen Co. says that Hurricane Donna made a 45 degree turn somewhere in Florida and passed out to sea between St. Augustine and Daytona Beach. "The center of the storm was approximately 90 miles from Savannah when it passed off shore, consequently, we were only brushed by its edges," Mr. Emerick said.

However, Savannah did suffer some minor damage from fallen trees, as winds reached approximately 40 miles an hour. There was also some flood from the rain in certain areas of the city. The Southern Nitrogen plant, however, was completely unscathed and experienced no difficulty at all from the storm, according to Mr. Emerick.

A similar happy-type story was told by G. W. Newton, plant manager of Southern Fertilizer & Chemical Co., also Savannah, Ga. He says that they had "no damage to our plant, so therefore had no time lost for repairs. Production goes on as usual."

PELLETIZED PLANE

MOSCOW—A Russian agricultural pilot, flying low over Soviet farmland spreading fertilizer (instead of propaganda), found that even though he was distributing a dry product, it was done so with a "boom."

The "boom" was not a device for spreading materials on the ground, but for aiming pellets at the plane. It seems that an over-zealous comrade out duck hunting had over-imbibed on vodka and had worked himself into the mood to shoot anything that flies, duck or otherwise. So when the low-flying plane swooned in, Ivan wasn't about to ask questions before taking a pot-shot at the winged object. "Spies!" his muddled mind probably told him. "My comrades have medals for shooting intruders . . . and this means U-too!" he muttered, raised his gun and fired.

The shot riddled the craft's gas tank, forced the shaken pilot to crash-land in a nearby field.

Despite the gun-wielder's good intentions and patriotic zeal, Soviet authorities took a dim view of this demonstration of enthusiasm. They sentenced Ivan to 8 years in prison.

PATENTS

Continued from page 24

soluble metal salts selected from the group consisting of ferrous, manganous, cuprous and zinc sulfates, chlorides and nitrates and mixtures thereof, the total amount of said supplements not substantially exceeding the proportion of 50 gm. of supplements to 200 gm. of diammonium phosphate and said solution containing a minimum of 0.1 gm. per liter of available trace metal for each metal salt contained therein.

January Pesticide Meeting Announced

LAFAYETTE, IND. — Time and place of the third annual Purdue agricultural pesticide conference have been announced by Dave Matthew, extension entomologist at Purdue University.

The two-day meeting will be held at the Purdue Memorial Center on the University campus, Jan. 17 and 18. Additional information as to program plans and names of speakers will be available shortly, he said.

PLANT FIRE

WAUTOMA, WIS.—Fire destroyed the Waushara Farmco cooperative fertilizer plant Aug. 31. Herbert Zellmer, manager, estimated the loss at $30,000. The plant, 50 x 100 ft., had been put into service only last summer. Nearby bulk oil tanks were not ignited by the blaze. Cause of fire has not been determined.

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THE PICTURES above were taken at the recent 8th Annual Meeting & Conference of the Canadian Agricultural Chemicals Assn. Douglas S. Harkness, Canadian minister of agriculture (center, left photo), addresses the group at the luncheon, held at the Britannia Hotel on the Lake of Bays in Muskoka, Ont. The center photo shows the head table and part of the 175 delegates and guests that attended the four-day meeting. The right photo shows R. B. Marr, general manager, Naugatuck Chemicals, outgoing president of the CACA, congratulating the new president, J. K. Brown, general manager, Green Cross Products. Delegates represented industry, government and science fields, and discussions covered all three phases.

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CACA MEETING

(Continued from Page 2)

Ltd., Montreal, secretary, and M. Propas, Chemical Specialties, Ltd., Sarnia, treasurer. Directors are: the immediate past president, R. B. Marr, general manager, Naugatuck Chemicals, Montreal; H. S. Smith, Allied Basic Chemical Co., Ltd., Toronto; G. E. White, Ortho Agricultural Chemicals Ltd.; New Westminster, B.C.; L. A. Miller, Shell Oil Co. of Canada Ltd., Toronto; J. W. Young, Cyanamid of Canada, Ltd., Montreal, and B. B. Marantz, Interprovincial Co-operatives, Winnipeg.

On Sept. 13, Dr. F. Glen, director general, research branch, Canada Department of Agriculture, started proceedings with a talk on "Evaluating New Pesticides."

Discussing the recently issued statement of "Policy on Evaluating New Candidate Pesticides in the Research Branch," Dr. Glen said, "The interest and importance of this statement to the pesticide industry was fully appreciated and extensive consultations between representatives of the Canadian Agricultural Chemicals Assn. and senior officers of the research branch were held before and during its preparation. Through this procedure certain compromises were made and the final product was as near to being mutually acceptable as was possible without testing it by actual use.

"Before 1960, branch policy on the cooperative testing of insecticides, fungicides and herbicides was informal and varied. The decision to change arose primarily from the need to guide more firmly than before the utilization of the research resources allotted to pesticide work, for the following reasons: The use of pesticides in agriculture and forestry is steadily increasing, branch researches involving pesticides are likewise expanding, industry is offering new compounds for evaluation at an ever-increasing pace, and commercially available pesticides are falling into reduced use or complete disuse at an alarming rate."

Making some general considerations, Dr. Glen said, in Canada farming and lumbering are conducted under an "astonishing variety of soils and climate and of management practices that are constantly changing in relation to these basic factors and to the influences of market requirements, available labor, and historical backgrounds of the people involved." As a result, he said, the circumstances under which Canadians farm are never precisely the same from province to province or from district to district, and important differences commonly exist from farm to farm, from field to field, and even within fields. The control of pests has to be attempted under these diverse conditions.

"Furthermore," he continued, "in agriculture and forestry we are

concerned with living things. Living things have great powers to adapt to environmental change and the agricultural environment is constantly changing both naturally and through the intervention of man. When we apply pesticides, therefore, we introduce them into a situation that is living and changing and that will alter still further and in special ways—perhaps many ways—as a result of such treatments.

"These are some of the facts that underlie the observation: Biological problems are seldom solved permanently. Common examples in support of this contention are: (1) the new races of wheat-stem rust that keep appearing to infect man-made varieties of wheat that were resistant to previously known races, and (2) the increasing number of insect species that have developed races resistant to insecticides that were previously effective against them."

Looking to the future, Dr. Glen warned that we must accept the fact that powerful new pesticides will continue to come into general use long before their long-term effects on the areas to which they are applied can be investigated.

"To elucidate these effects is a slow and expensive business, and before even a reasonable start can be made the research workers are overwhelmed by pressure from industry to evaluate more new compounds. Or take an example of more immediate significance: the problem of terminal residues on food. This is probably the major practical issue facing pesticide workers today. But our efforts to reduce residues through an intensive research attack on the factors that govern wetting, spreading, adherence, penetration and persistence under Canadian conditions of use are sporadic and trivial in relation to the need. And we have not yet begun to consider the residue problem arising from carriers and adjuvants. Sooner or later this will likely plague us in view of the mounting interest of medical authorities in the subject of chemical additives in food.

"The constant preoccupation of our research staff with the evaluation of new pesticides yields important benefits, but it is not a healthy state of affairs. It prevents the concentrated and sustained effort required to unravel intricate problems associated with the proper use of pesticides."

He then noted that the research branch undoubtedly could increase its efforts in intensive and long-range work, but only if the pesticide industry or some other agency could take over a greater share of the regional testing on which considerable branch resources are currently used. In raising this question, Dr. Glen did not place greater practical value on basic research than on sound and adequate testing of new materials.

"Both are essential," he said. "The point to be emphasized is that we need to create a more stable research situation if we are to achieve the transfusion of new knowledge into both the pesticide and agricultural industries that is required to keep them thriving and adequate in the face of increasing world competition for markets.

"Perhaps the C.A.C.A. should consider the establishment of a comprehensive non-profit pesticides testing center, perhaps with regional branches, through which interested companies could have pertinent trials conducted on a strictly secret basis. I know that services of this kind have been handled for manufacturing companies through the Stanford Research Institute at Pala Alto, Cal., and through the Crop Protection Institute at Durham, N.H. The possibilities inherent in such a scheme should at least be explored in an effort to free government staffs for more effective researches. The pesticide industry has made a magnificent contribution to human welfare in the past and it will unquestionably find the imaginative leadership to guide it wisely into the future."

Following Dr. Glen on the program was Dr. A. W. A. Brown, head, department of zoology, Western University, London, Ont. Dr. Brown, who discussed "Insect Resistance," said that in spite of the remarkable progress made in the field of agricultural insecticides in the '50's, the same decade also showed that insects and mites were not stationary targets.

"We can expect resistance to appear in further species and to spread geographically in any one species," Dr. Brown said. "To be forewarned we would be very wise to watch what happens in that great country to the south. We would also be wise to encourage, promote or actually conduct tests and more tests on the susceptibility levels of pest populations. There will be an increasing need for remedial insecticides, and those concerns who have them ready for the consumer will justly reap advantage out of adversity."

Offering more advice, he said that the industry must keep well informed in the resistance field, because "there are no single, snap or doctrinaire solutions to the problem, and each species in each region is almost a special case.

"Fortunately, it appears that governmental research, grant-supported investigations in the universities and commercial enterprise, not only in Canada and the U.S., but in many other parts of the world, will continue to learn more about this complex biological phenomenon, to add to the one thousand papers already published on the subject.

"Some of us are in it for fun, others for their daily bread and yet others are out for profit; yet we all are part of the same team matched against more formidable and resourceful opponents than we have perhaps realized, and the stakes are no less than the sustenance and health of our country and the world."

"Tariff Reference 120" was discussed by George Garrett, manager, sales relations, Union Carbide, Canada Ltd., chemicals and plastics division.

Don Henshaw, MacLaren Advertising Co. Ltd., was the banquet speaker. His topic was imagination in advertising and business. Mr. Henshaw suggested, with all of the imagination being used to create space ships and super weapons, it might be a good idea if all of these imaginative minds "take a sabbatical and put their heads together to figure out a

(Turn to **CACA MEETING**, Page 31)

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1961 Chemical Business Outlook Good, But Need Seen for More Plant Efficiency

THE BUSINESS OUTLOOK for the chemical industry appears bright for the remainder of the current year and also for the first half of 1961, according to a recent survey made by the Manufacturing Chemists' Assn. A record sales year of $28 billion was forecast on the basis of the survey.

Should the prediction hold true, the increase over 1959's sales would be some 9%, since last year's figure was $25.7 billion. Noted also in the report is an important "however" which has been appearing with more and more frequency of late. In this case, the "however" says that the profit picture has not improved to the same degree as have sales. A mixed trend is apparent in corporate reports for the first six months of 1960, the report noted, with a large percentage of the companies surveyed stating that costs are expected to increase during the last half of 1960 with prices either remaining steady or tending to drop slightly.

Thus, no letup in the cost-price squeeze on chemical manufacturers is seen for the next year, with some companies interviewed expecting costs to jump 5% or more both during the last half of 1960 and the first six months of next year. It is not difficult to assume, therefore, that many company managements anticipate a most serious problem in maintaining necessary profit margins.

A list of factors entering into the tight situation will certainly sound a familiar note to the operators of fertilizer and pesticide plants across the country. Chemical firm executives in the survey cited the following as important influences in the squeeze: wage demands in excess of productivity increases; augmented foreign and domestic competition; increasing energy, transportation, raw materials and services costs; further encroachment of tax-free cooperatives on corporate enterprise; high research, marketing and engineering overhead, and an excess productive capacity, world-wide in certain chemical lines.

The report said that all chemical executives surveyed agree that prices for chemical products must keep pace with increased costs if the industry is to have sufficient earnings to meet consumer demands for new products and expanded production.

There are indications from replies to the survey that there will be no significant reductions in dividend payments during the year. Further, capital expenditures for new plant and equipment are expected to continue as planned.

Current outlays, as well as those earmarked for the next six to eight months, are being devoted 63% to new product plant and equipment and only 37% to improved facilities for existing products. These expansion programs are going forward despite a growing awareness among chemical industry executives of increased pressure from imports.

The MCA report noted that 30% of the producers "state categorically that imports have materially affected their domestic sales during the past year. An additional 30% say this impact will be more intense during the next two years.

The survey summary did not indicate whether or not manufacturers of agricultural chemicals were included among those interviewed, but much of the information gained from the report appears to be applicable to this trade. Corporate reports from many firms making pesticides and/or fertilizers have shown sales volume as being on the increase, but profits tending not to keep pace with added gross volume.

It all adds up to the need for greater efficiency in both the production and marketing phases of business. To compete not only with contemporaries in the field, but also with the strain of cost-price pressure requires a continuation of streamlining all phases of the business. This will include, of course, replacement of obsolete machinery and other equipment, and adoption of more efficient material handling and packaging devices.

Generous Juries Jeopardize Firms in Damage Suits

THE SPECTRE of lawsuits against chemical firms, particularly those manufacturing and marketing pesticides of various types, has always been with the industry, but becomes a reality only infrequently.

Astute observers in the field, however, are viewing with alarm the significance of a recent case where an auto owner was able to collect from both the dealer and the manufacturer for injuries received when the car had gone out of control and crashed, injuring the owners. Courts in the state where this accident happened held that there was no proof that either company had been negligent in making or servicing the car, but the injured were awarded $30,000 just the same.

In a recent article concerning this situation and others of similar nature, the Wall Street Journal called the verdict described above "one of the most significant and potentially far-reaching of several recent court decisions which have broadened the concept of product liability."

The Journal observes that recent developments reveal a trend and design in legislative and judicial thinking toward providing protection for the buyer. Thus, an injured person in a growing number of cases can now sue not only the retailer from whom he bought the product, but anyone else involved in making and marketing it. Furthermore, the person suing does not have to be the purchaser, but can be anyone who could reasonably have expected to use it, such as a member of the family.

Such a philosophy applied to the pesticide industry could raise an untold amount of havoc. This would be particularly true from the fact that apparently negligence is not always a factor in some of the recent cases noted. Courts may simply find that injury resulted from normal use of a product and decide this is reason enough to hold a company liable.

The pesticide trade from basic manufacturer down to the crossroads dealer could be affected by these far-reaching precedents. Juries are too often infected by the "companies-are-rich-so-let's-award-this - plaintiff-all-he-asks-for" philosophy, and with this attitude are easily swayed by the emoting of a clever attorney.

Careful records kept by health authorities confirm the fact that very few people are ever injured when pesticides are handled and applied in accordance with the label instructions. More and more emphasis must be placed on the "read and heed" campaign, urging all users to take the time to look at labels, study what they say, and then to DO these things.

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INDUSTRY MEETINGS

Nov. 1-2—Michigan Agricultural Pesticide Conference, Kellogg Center, Michigan State University, East Lansing, Mich.

Nov. 21—South Carolina Plant Food Educational Society annual meeting, Clemson House, Clemson, S.C.

Dec. 1-2—Ohio Fertilizer and Lime Conference, Agricultural Administration Building, Ohio State University, Columbus, Ohio.

1961

Jan. 4-6—Northeastern Weed Control Conference, 15th annual meeting, New Yorker Hotel, New York City.

Jan. 17-18—Third annual Agricultural Pesticide Conference, Purdue Memorial Center, Purdue University, Lafayette, Ind.

Jan. 23-25—Southeastern Branch, Entomological Society of America, 35th annual meeting, Admiral Semmes Hotel, Mobile, Ala.

Jan. 25-26—Symposium on "Effects of Environment on Crop Response to Fertilizers," Tennessee Valley Authority Fertilizer Development Center, Muscle Shoals, Ala.

Feb. 9-10 — Annual joint meeting, Midwest Industry-Agronomists, Edgewater Beach Hotel, Chicago.

Meeting Memos listed above are being listed in this department this week for the first time.

Sept. 27-29—Annual meeting of National Agricultural Chemicals Assn. for 1960, Hotel del Coronado, Coronado, Cal.

Sept. 29-30—Iowa Seed Dealers Assn., Savery Hotel, Des Moines, Iowa.

Sept. 29-30—Northeast Fertilizer Conference, Hotel Hershey, Hershey, Pa.

Oct. 5-6—Southeast Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 10-11—2nd annual Four State Aerial Applicators Conference, Yakima, Wash., Norkem Corp. sponsoring.

Oct. 10-12—Association Official Agricultural Chemists, Shoreham Hotel, Washington, D.C.

Oct. 13—Association of American Control Officials' States' Relations Committee meeting, Shoreham Hotel, Washington, D.C.

Oct. 14 — Association of American Fertilizer Control Officials, Shoreham Hotel, Washington, D.C. B. D. Cloaninger, Box 392, Clemson, S.C., secretary.

Oct. 19—Executive Committee, National Safety Council, Fertilizer Section, National Safety Congress, Chicago.

Oct. 17-21—National Safety Congress, 48th annual meeting. Fertilizer Section meets at Morrison Hotel, Chicago.

Oct. 27-28—Eastern Branch meeting, Entomological Society of America, New Yorker Hotel, New York.

Oct. 30-Nov. 3—National Association of County Agricultural Agents annual meeting, Hotel Deauville, Miami Beach, Fla.

Oct. 31-Nov. 3—International Crop Improvement Assn. meeting, Denver, Colo.

Nov. 2-4—Fertilizer Industry Round Table, Hotel Mayflower, Washington, D.C.

Nov. 3-4—Pacific Northwest Plant Food Assn. 1960 annual convention, Boise, Idaho.

Nov. 4-17—Seed and fertilizer clinics, University of Illinois, Nov. 4, Vandalia; Nov. 15, Macomb; Nov. 16, Dixon and Nov. 17, Urbana.

Nov. 9-11—National Fertilizer Solutions Assn., annual convention, Peabody Hotel, Memphis, Tenn.; Muriel F. Collie, executive secretary.

Nov. 13-15—California Fertilizer Assn., 37th annual meeting, del Coronado Hotel, Coronado, Cal.

Nov. 14-19—Mexican Association of Insecticide and Fertilizer Manufacturers, Merida, Yucatan.

Nov. 22—Tenth Semi-Annual Meeting, Manufacturing Chemists' Assn, Statler Hilton Hotel, New York City.

Nov. 28-30 — Soil and Crop Science Society of Florida, Fort Harrison Hotel, Clearwater, Fla.

Nov. 28-Dec. 1—Eighth Annual Meeting, Entomological Society of America, Haddon Hotel, Atlantic City, N.J.

Nov. 29—Oklahoma Fertilizer Dealers Conference, Oklahoma Plant Food Educational Society and Oklahoma State University cooperators, Huckins Hotel, Oklahoma City, Okla.

Nov. 30 — New Jersey annual fertilizer conference, Rutgers University, New Brunswick, N.J. Sponsored by Plant Food Educational Society of New Jersey.

Dec. 12-14 — North Central Weed Control Conference, Hotel Schroeder, Milwaukee, Wis. T. W. Tibbets, Department of Horticulture, University of Wisconsin, Madison, public relations committee.

Dec. 14—Louisiana Fertilizer Conference, Louisiana Plant Food Educational Society and Louisiana State University cooperators, Baton Rouge, La.

1961

Jan. 5-7 — Eleventh annual convention, Agricultural Aircraft Assn., Inc., Hotel El Dorado, Fresno, Cal.

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KILL BITTERWEEDS, wild onions and dog fennel with R-H WEED RHAP. Low cost. Will not injure grass, grains; not poisonous. For free information write Reasor-Hill Corporation, Box 36CL, Jacksonville, Arkansas.

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CACA MEETING

(Continued from page 29)

way in which the world can live together in harmony."

On Sept. 14, the session was taken up by a "Marketing Mix" panel, moderated by A. W. Hutchinson, Shell Oil Co. of Canada Ltd., and a discussion on "Selling and Advertising" by Louis F. Czufin, California Spray-Chemical Corp.

W. H. Hunter, Chipman Chemicals Ltd., started the panel discussion with a look at credit. Mr. Hunter felt that the solution to the growing problem of the farmer's ability to pay is to educate him to be more efficient in his farming and management operations.

Following this, W. H. Silversides, Interprovincial Cooperatives Ltd., discussed "The Co-op Method of Marketing Agricultural Chemicals."

R. H. Strong, Naugatuck Chemicals, was the next speaker. He talked on the "Problems Experienced in the Introduction of a New Agricultural Chemical to the Market."

"Distribution" was covered by J. Neil, Niagara Brand Chemicals, and P. Hellman, Panogen of Canada Ltd., talked on "History of Marketing Seed Dressing Compounds in Canada."

Other panel speakers included R. F. Byrnes, Rohm & Haas Co. of Canada Ltd., who had the subject "Pricing of an Agricultural Chemical," and L. Havard, Green Cross Products, Sherwin Williams Co. of Canada Ltd., who talked about advertising.

Mr. Czufin, in answer to the question "How can the agricultural chemical industry increase sales and profits?" said that advertising could save the agricultural chemical salesman the first three steps in manufacturing sales. "These are," he said, "contacting the prospect, arousing his interest and creating a preference. The dealer, distributor or company salesman now takes over and makes a specific proposal, closes the order and keeps the customer sold."

He noted an urgent need for development budgets on advertising and promotion—"and an indication of some of the tools that you may wish to consider in the development of your own program."

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Ernie Herrbach stands guard over the quality of Anhydrous Ammonia and Nitrogen Solutions you buy

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